Productivity in Ireland's Domestically-Owned Market Economy: a Comparative Survey

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We estimate that Irish domestically-owned sectors generate low levels of productivity compared to other small open economies in Europe

Summary

Using Eurostat's Globalisation in Business Statistics database, supplemented by data from National Accounts and price indices, we compare enterprise productivity across the main market sectors in the European small, advanced, open economies. We focus exclusively on domestically-owned (or indigenous) enterprises, excluding foreign-owned companies. We use value-added per hour worked as the measure of apparent labour productivity. We estimate that Irish domestically-owned sectors generate low levels of productivity compared to other small open economies in Europe. We hope this survey will encourage further research and debate.

1. Rationale

Ireland has a particularly small domestic economy when measured by the share of gross value added (GVA) produced by domestically owned firms compared with the majority of other countries. This is even true when looking at a narrower group of small open advanced economies (SOAEs), which are typically classified as having high levels of trade to GDP, high levels of exports, and can be attractive places to invest and locate economic activity[1]. Ireland is atypical in that, while its share of market employment in foreign owned firms is not significantly above the average of SOAEs (26.4 per cent vs 19.6 per cent in 2019), its share of value added is significantly higher. Almost 70 per cent of value added in the market economy was generated by foreign owned firms in 2019, compared with an average of around a third for SOAEs.

This makes understanding productivity in the Irish context particularly challenging. To illustrate, the most recently published quarterly data from the Central Statistics Office (Q4 2023) estimate that hourly productivity in 'economic sectors dominated by domestic' enterprises is €53.8 per hour; hourly productivity in 'economic sectors dominated by foreign-owned multinational enterprises' was €381 per hour[2]. This paper explores this disparity using a different approach, utilising Eurostat's Globalisation in Business Statistics database to isolate gross value added generated by domestically owned firms in Ireland and across peer SOAEs, in order to better identify areas where Ireland falls behind or exceeds domestic productivity among its peers, and to encourage further analysis in this area.

1 Keogh, Robert and Brassil, Cliona (2018) "Small Open Advanced Economies – A comparative analysis" IGEES Unit. Department of Public Expenditure and Reform. Available at: https://assets.gov.ie/180714/bb20702c-af59-4292-9255-99d76f3759d5.pdf

2 https://www.cso.ie/en/releasesandpublications/fp/fp-piiq/productivityinirelandquarter42023/

2. Introduction

The following compares productivity in the domestically-owned market economy[3] using Eurostat's Globalisation in Business Statistics[4], National Accounts[5] and GDP Price Indices[6]. Our productivity measurement is '*apparent labour productivity*', or value-added per hour worked.

The comparator countries are small, advanced, open economies (SAOE), a grouping identified in the IGEES's Small Advanced Open Economies: A comparative analysis: Austria, Belgium, Denmark, Finland, Ireland, Luxembourg, Netherlands, Norway and Sweden. These economies share a number of characteristics with Ireland: high-income, small population and domestic markets, and a high reliance on exports.

We average the annual output from 2017, 2018 and 2019 in order to reduce the impact of 'lumpy' data (data which spikes in a single year) or missing years. Where there is two or more years missing, we exclude the data. While there is data for 2020 there are gaps (in that year Ireland did not report the majority of sectors). Further, the impact of covid-related public health measures could produce highly volatile and subsequently unreliable data. In 2021, Eurostat revised their Globalisation database, introducing new measurements and categories. We report this data separately, acknowledging potential distortions due to continuing public health measures.

Eurostat's Globalisation database provides data on the numbers employed in domestically-owned sectors but does not report hours worked. Productivity per employee is an inferior comparison as working hours can vary significantly between countries (e.g. annual working hours per employed in the Irish manufacturing sector exceeds the SAOE average by 277 hours or 16.6 per cent). We use 'hours worked' from the National Accounts which reports the full sector; that is, both domestic and foreign-owned enterprises. The assumption is that hours worked in the domestically-owned sector is the same as the full sector reporting.[7] If there is a difference, we assume it is approximately the same in all the surveyed economies. We provide value-added per hour worked in nominal and real values. The GDP price index deflator, which benchmarks prices against the EU average, is used to determine *real* value. The average for all the SAO economies is weighted by hours worked.

The following outlines the steps we took to estimate productivity in each country by using the case example of Ireland's domestic manufacturing sector.

3 The market economy excludes agriculture, public administration, health, education and arts/recreation. While the financial sector is a market sector, Eurostat excludes this.

4 Eurostat: Foreign control of enterprises by economic activity https://ec.europa.eu/eurostat/databrowser/view/fats_g1a_08/default/table?lang=en&category=gbs.fats.fats_h

5 Eurostat: National accounts employment data by industry https://ec.europa.eu/eurostat/databrowser/view/nama_10_a64_e/default/table?lang=en&category=na10.nama10.nama_10_dbr

6 Eurostat: Purchasing power parities https://ec.europa.eu/eurostat/databrowser/view/prc_ppp_ind/default/table?lang=en&category=prc.prc_ppp

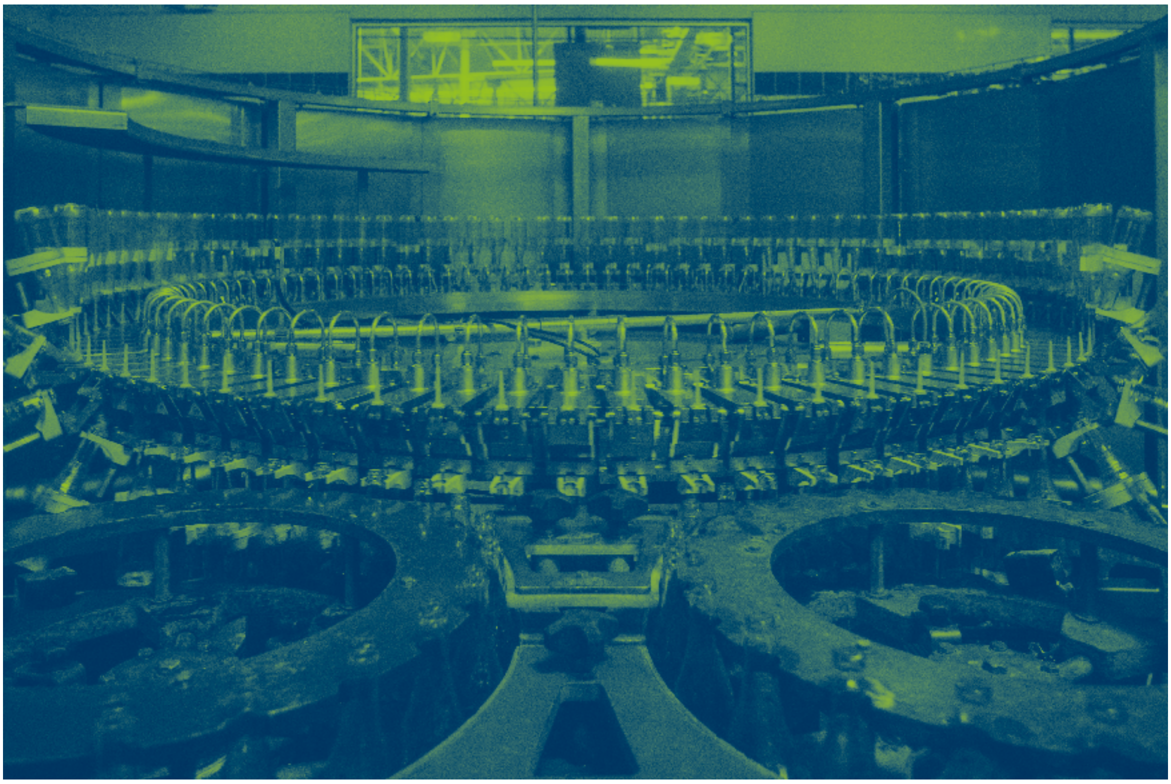
7 The CSO provides data on hours worked in the domestic and foreign-owned manufacturing sector which shows that hours worked are approximately the same with less than a one per cent variation in the years 2017-2019. In this sector, our assumption holds up: https://data.cso.ie/table/PIA15

Table 1: Steps in Estimating Ireland's Domestic Manufacturing Productivity in 2019

Step 1: Domestically-owned manufacturing	Value-Added million:	Persons Employed:	Value-Added per Person Employed:
	€10,616.2	123,263	€86,126
Step 2: Total Manufacturing Sector	Thousand Hours Worked:	Thousand Persons Employed:	Annual Hours Worked per Employed:
	488,811	254.78	1,918.6
Step 3: Estimate Nominal Value-Added per Hour	Value-Added per Person Employed divided by Annual Hours Worked per Employed:		
	€44.89		
Step 4: Estimate Real Value-Added per Hour	**Nominal value-added per hour:**	GDP Deflator (*Price Index*):	**Real Value-Added per Hour:**
	€44.89	122.1	**€36.77**

We repeat this process for each of the nine SAOEs in the three years 2017 – 2019. Full sectoral tables are provided in the Appendix.

We would emphasise that, given the adjustments and assumptions outlined above, these should be treated as estimates.



3. The Market Economy

The market, or business, economy can be taken as a proxy for the private sector. The Eurostat data up to 2020 excludes the financial sector. We further exclude real estate as this sector, while small in numbers employed, has high-levels of value-added which reflects prices in the property sector. In two further adjustments, we exclude aircraft leasing from Irish data (through the Eurostat category of 'Rental and leasing activities') which is consistent with the CSO's exclusion in determining modified gross national income[8] and the CSO's productivity database.[9] Additionally, as Norway's market economy figures are heavily distorted by its Mining and quarrying sector, yet these sector totals are redacted for multiple years which we analyse and hence cannot be deducted from the total, Norway has been removed from the SAOE market economy average.

Table 2: Market Economy Value-Added per hour Worked 2017-2019 average (€)

Nominal		Real	
Denmark	57.5	Luxembourg	43.9
Luxembourg	55.0	Denmark	42.8
Belgium	41.0	Belgium	36.2
SAOE	39.3	Austria	32.8
Sweden	37.5	SAOE	32.8
Finland	37.4	Netherlands	30.7
Austria	37.1	Finland	29.6
Netherlands	35.1	Sweden	29.2
Ireland	33.0	Ireland	28.0

In the domestically-owned market economy Ireland performs poorly compared with other SAO economies, coming in at the bottom of the table.

- Irish productivity would have to increase by 19 per cent to reach the average of our peer group.
- When prices are factored in (using the GDP deflator), Irish productivity would have to increase by 17 per cent to reach the SAOE average.

This is a significant deficit. In 2019, increasing productivity by 17 per cent in the domestic market economy would be equivalent to approximately an €11 billion rise in value-added.

Sectoral comparisons can help us obtain a picture of where in the market economy Ireland's productivity deficit occurs.

8 CSO National Accounts: https://data.cso.ie/table/NA001
9 CSO Productivity in Ireland: Productivity in Ireland Quarter 4 2023 - Central Statistics Office

4. Sectoral Comparisons

We survey the eight main economic sectors in the market economy, excluding smaller sectors (mining, utilities, water & waste).

Table 3: Real Value-Added per Hour by Sector 2017-2019 average (€)

	Ireland	SAOE Average	*% Above / Below SAOE Average*
Wholesale & Retail	24.1	29.8	*-19.1*
Manufacturing	35.3	43.5	*-18.9*
Transport & Storage	29.6	35.9	*-17.7*
Hospitality	13.7	16.4	*-16.5*
Information & Communication	36.1	41.8	*-13.6*
Adjusted Administrative Services	20.7 *	22.9	*-9.7*
Construction	29.7	29.0	*2.4*
Professional & Scientific	41.2	33.6	*22.6*

* Administrative Services is adjusted here by removing "Rental and leasing activities". Given that 2019 saw Ireland's Adjusted Administrative Services value-added falling substantially relative to 2017 and 2018, we remove 2019 from Ireland's average. Nonetheless, Irish productivity remains poor in this sector, at 9.7% below the SAOE average. Were 2019 data included, then real productivity would fall to €17.5 per hour

- Wholesale & Retail and Manufacturing are the worst performing sectors compared to the average of SAO economies, followed closely behind by Transport & Storage, and Hospitality sectors. These sectors accounted for 58 per cent of total Irish domestic market economy employment in 2019.

- Information & Communication and Adjusted Administrative Services also fall significantly behind. These sectors comprised 14 per cent of employment.

- Only the Construction and, especially, Professional & Scientific sectors generate productivity above SAOE averages. These sectors comprised 25 per cent of employment.

Over 70 per cent of people working in the domestically-owned market economy work are employed in sectors that generate relatively low levels of productivity.

a) Comparison of Sub-Sectors

We can gain further insight by looking at the largest sub-sectors.

Table 4: Real Value-Added per Hour by Sub-Sector 2017-2019 average (€)

	Ireland	SAOE Average	*% Above / Below SAOE Average*
Food Manufacturing * ** *(Manufacturing)*	22.1	32.5	*-32.0*
Land Transport (Transport & Storage)	19.3	26.8	*-27.9*
Architectural and engineering activities; technical testing *(Professional & Scientific)*	27.9	35.1	*-20.5*
Retail *(Wholesale & Retail)*	17.3	21.1	*-18.0*
Food and beverage service activities ** *(Accommodation and Food Services)*	12.3	14.3	*-14.0*
Computer Programming ** (Information & Communication)	34.5	36.3	*-5.0*
Employment Activities *(Adjusted Administrative Services)*	15.3	15.3	*0*
Construction of Buildings ** *(Construction)*	43.4	33.3	*30.3*
Activities of Head Office / Management Consultancy ** *(Professional & Scientific)*	75.8	38.9	*103.5*

* Given that 2018 saw Ireland's Food manufacturing value-added falling substantially before bouncing back in 2019, we remove 2018 from Ireland's average. Nonetheless, Irish food manufacturing productivity remains particularly poor. Were 2018 data included, then real productivity would fall to €18.6 per hour and Ireland would trail the SAOE average by 42.8 per cent.

** In particular subsectors, hours worked data was either not available for the specific subsectors or was only reported for the broad sector; for example, Food manufacturing was only available as an aggregate of "Manufacture of food products; beverages and tobacco products". In these cases, average hours worked were calculated using the available data, and these instances are flagged and discussed in more detail in the Appendix.

Among the sub-sectors surveyed above, Food Manufacturing is the worst performer. At the other end, Activities of Head Office / Management Consultancy greatly exceeds the SAOE average.

A more detailed examination of sub-sectors can also give us a more nuanced perspective on overall sectoral performance. For instance, the Professional and Scientific sector is Ireland's best performing sector relative to our peer group. However, as seen above, the difference between two sub-sectors is stark: Activities of Head Office is double the SAOE average while Architectural and Engineering is well below. When we exclude Activities of Head Offices, which makes up only 20 per cent of employment in the sector, Ireland's Professional and Scientific performance falls below the SAOE average.

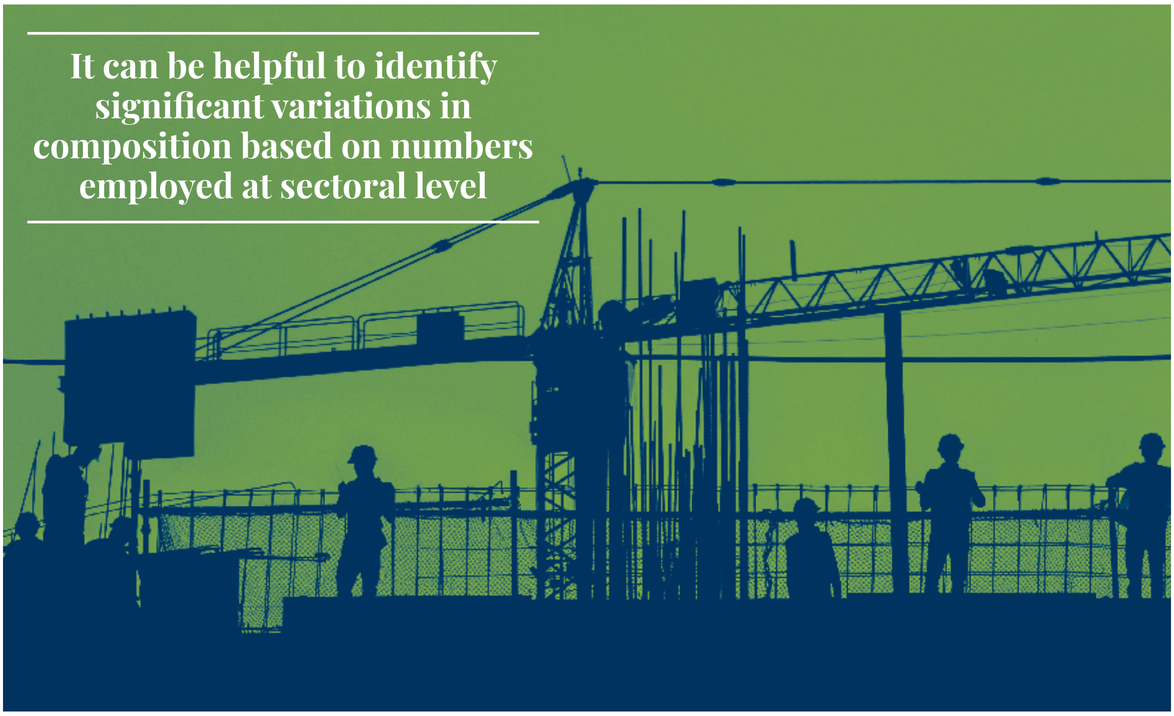
5. Composition of Value-Added Activity

Comparing data at the market economy and sectoral level does not take into account compositional differences. This can impact on overall market economy productivity. Therefore, it can be helpful to identify significant variations in composition based on numbers employed at sectoral level.

Table 5: Employment Composition

	Ireland % of Total Market Employment	SAOE % of Total Market Employment
Construction	12.2	12.7
Wholesale & Retail	23.0	22.0
Transportation & Storage	7.9	7.8
Information & Communication	4.8	5.4
Professional & Scientific	11.7	11.5
Total Above Sectors	59.7	59.3

In the above five sectors, the share of employment in Ireland and the SAOE average is approximately the same. However, there are three sectors where there are significant variations between Ireland and SAOE.



a) Manufacturing

Ireland has a lower share of employment in manufacturing than other SAO economies.

Table 6: Manufacturing and Food Employment and Value Added

	Manufacturing Employment as a % of Total Market Employment	Food Manufacturing as a % of Total Manufacturing Employment	Non-Food Manufacturing Employment as a % of Total Market Employment
Ireland	10.6	28.9	7.6
SAOE	13.9	17.5	11.5

Irish employment in manufacturing falls well below the share in SAO economies – 24 per cent below. Given that manufacturing in the SAOE generates the highest level of hourly value added in the market economy (for Ireland, second highest behind Professional & Scientific), the Irish domestic economy is 'under-represented' in this high-value added sector. Irish employment in domestic manufacturing would have to increase by over 45,000 to reach the SAOE average.

Within manufacturing Food manufacturing is a low value-added activity relative to the sectoral average. In this sub-sector, Irish employment share is significantly above the SAOE average (28.9 and 17.5 percent respectively). Given that Irish value-added in the food sector significantly trails the SAOE average, we have a situation where Irish manufacturing employment – already low by SAOE standards - is concentrated in a lower value-added sub-sector.

When we remove the food sector to focus on Non-Food Manufacturing, Irish employment share falls even further behind the SAOE average – 34 percent below. However, Irish value-added in this sub-sector holds up better relative to the SAOE average: in real terms €42.1 per hour in Ireland compared to an SAOE average of €45.8. Where Ireland performs better, it is even more 'under-represented'.

b) Hospitality: Accommodation & Food Services

Hospitality (Accommodation & Food Services) is the lowest generator of value-added among all the main sectors. We saw above that Irish hospitality value-added significantly trails the SAOE average. In addition, there is a high level of employment concentrated in the Irish sector relative to the SAOE.

Table 7: Hospitality Employment

	Ireland	SAOE
Hospitality Employment as a % of Total Market Employment	16.5	8.5

One in every six employed in the Irish domestic market economy works in the hospitality sector. This is nearly twice the level of the SAOE average. In addition, Irish hospitality productivity is 16 percent below the SAOE average. Ireland is 'over-represented' in a low-value added sector with the lowest hourly productivity output in that sector.

It can be argued that employment in the hospitality sector is a consequence of high levels of tourism in Ireland. We can measure the extent to which higher demand results in higher levels of employment.

Table 8: Tourist Numbers and Hospitality Employment: 2019

	Nights spent at tourist accommodation establishments *(per 1000 inhabitants)*	Hospitality Employment as a % of Market Economy Employment
Austria	14,437	12.5
Netherlands	7,143	8.9
Ireland	6,643	16.5
Sweden	6,175	7.6
Denmark	5,912	8.4
Luxembourg	4,646	9.2
Finland	4,186	6.0
Belgium	3,711	6.5
Norway	No data	8.1

Austria has the highest level of tourism (as measured by nights spent at tourist accommodation establishments[10]), more than twice the level of Ireland. Yet it has a lower concentration of hospitality employment. The Netherlands, with a higher level of tourism, also has substantially less concentration. Sweden and Denmark trail Ireland in tourism numbers, but not significantly so. They, too, have lower levels of concentration. Higher levels of tourism are not necessarily a guide to hospitality employment concentration.

Austria has the highest level of tourism... more than twice the level of Ireland

10 Eurostat Nights Spent at Tourism Accommodation Establishments: https://ec.europa.eu/eurostat/databrowser/view/tour_occ_ninat/default/table?lang=en&category=tour.tour_inda.tour_occ.tour_occ_n

c) Administrative Services

Administrative Services is a relatively low value-added sector. Only hospitality is lower.

Table 9: Administrative Services Employment and Real Value-Added

	Administrative Services Employment as a % of Market Employment *(2019)*	**Administrative Services Real Value-added per hour (€)** *(2017-2019 Average)*
Ireland	9.3	20.7 *
SAOE	13.4	22.9
* Adjusted		

There is a higher level of Administrative Services employment in the SAOE: 13.4 percent compared to Ireland's 9.3 percent. However, SAOE value-added is higher than Irish productivity levels in this sector.

6. Trends in Irish Productivity

The National Economic and Social Council signalled a concern that productivity in the domestically owned sector has slowed down and even fallen[11]:

> **'Ireland has had a slowdown in its domestic sector's productivity growth in recent years, with slow or even negative productivity growth in domestic manufacturing, accommodation and food, financial and insurance services, and administrative and support services.'**

While not the focus of this paper, we provide a headline view of trends since 2014.

Table 10: Increase in Irish Real Gross Value-Added per Hour 2014 – 2019 (€)

	2014 - 2016 Average	2017 – 2019 Average	% Increase
Professional & Scientific	34.1	41.2	20.8
Construction	25.6	29.7	16.0
Manufacturing	30.8	35.3	14.6
Administrative Services *	65.3	63.7	-2.5
Hospitality	14.5	13.7	-5.5
Wholesale & Retail	26.9	24.1	-10.4
Information & Communication	45.5	36.1	-20.7
Transport & Storage	38.5	29.6	-23.1
* Includes Renting and leasing activities (which includes Aircraft Leasing)			

The majority of sectors experienced a decline in productivity while Professional & Scientific, Construction and Manufacturing saw a rise. This should, however, be treated cautiously as some sectors did not report 2015 data. Further, classification issues in separating foreign and domestic-owned companies in particular sectors (e.g. Information & Communication) could result in inconsistent data over the years.

11 https://www.nesc.ie/publications/understanding-the-irish-economy-in-a-time-of-turbulence/

7. 2021 Data

Eurostat revised their Globalisation database starting in 2021 with new measurements and categories. We have not fully reported this owing to the potential impact of Covid-related public health measures across the comparator countries. Further, Eurostat has regrouped sub-sectors which makes a comparison with pre-2021 data difficult. Nonetheless, for indicative purposes, we provide the headline sectoral data.

Table 11: Real Value-Added per Hour by Sector: 2021 (€)

	Ireland	SAOE	*% Above / Below SAOE Average*
Transport & Storage	20.9	43.7	*-52.2*
Construction *	21.5	31.6	*-32.0*
Information & Communication	32.5	46.7	*-30.4*
Wholesale & Retail	30.1	36.6	*-18.0*
Manufacturing	47.0	54.7	*-14.1*
Adjusted Administrative Services	23.4	28.4	*-17.8*
Hospitality	18.1	18.2	*-0.5*
Professional & Scientific	49.0	39.2	*25.1*
* No data for Denmark and Norway			

Transport and Construction sectors dramatically deteriorated by 2021. However, as both sectors were hit with Covid-related restrictions, this decline may be temporary. Information and Communication also suffered a significant decline. On the other hand, Hospitality pulled even with SAO economies. However, this too may be a consequence of Covid measures. Hours worked in Irish Hospitality fell by 33 per cent between 2017/19 and 2021 while in the SAOE, it fell by only 14 per cent. This could have caused a temporary increase in hospitality productivity in Ireland.

8. Reasons for Productivity Output

We have focused on measuring and comparing productivity in domestically-owned sectors in Ireland and other small advanced open economies. We are not attempting to interpret the data (i.e. give reasons for superior or inferior comparative performance). However, there can be a number of causes for sub-optimal productivity output at national, sectoral and firm level. A non-exhaustive list could include:

- Low infrastructural quality
- Low levels of investment
- Peripherality and transport costs
- Fragmentation and lack of scale
- Managerial deficits and a crowding-out effect of foreign-owned companies
- Access to, and cost of, capital
- Input costs and supply chain management
- Entry barriers and reduced market competition
- Low expenditure on education, training and R&D
- Lack of employee voice (e.g. diminished collective bargaining coverage and employee participation)

This paper represents a first step - a descriptive exercise. The next step is to provide reasons for productivity output, both positive and negative. The final step would be to address the deficits identified.

9. Provisional Conclusions and Implications for Policy

Most people work in the domestically-owned market economy. In 2019 the numbers employed exceeded 1.2 million – or more than half of all employed. Recently, the Irish economy's over-reliance on the multi-national sector and the performance of particular domestic sectors has featured in the public debate. Our survey will hopefully help inform that debate.

Using an apparent labour productivity measurement, we estimate that productivity in Ireland's domestically-owned market economy trails comparable sectors in our European peer group. In some sectors, the gap between Ireland and other SAO economies is significant. We are conscious that this is only one of many productivity measures but Eurostat's Globalisation database has the advantage of separating domestically-owned and foreign-owned enterprises.

There can be a number of explanations for Ireland's poor domestic productivity. We have not discussed these. The first step is to measure so as to answer the question: is there a productivity problem in Ireland's domestic sector. Low productivity results in lower wages, profits, investments and economic activity relative to the benchmark; in this case, our peer group's performance.

It is our hope that this paper will encourage researchers to explore Ireland's comparative domestic productivity performance as the first step in explaining the reasons for such relatively sub-optimal performance.

Appendix

Sectoral Comparisons

Manufacturing

Employment in ***Food Manufacturing*** makes up 28.9 percent of total manufacturing employment.

Real Value-Added per Hour: (€ GDP PPP)

Manufacturing		Sub-Sector: Food Manufacturing **	
Denmark	61.3	Denmark	41.7
Belgium	48.2	Belgium	39.5
Netherlands	45.1	Netherlands	38.1
Austria	44.3	Norway	35.4
SAOE	43.5	SAOE	32.9
Luxembourg	43.4	Finland	31.7
Finland	40.6	Austria	29.8
Sweden	36.7	Sweden	23.8
Norway	36.2	Ireland *	22.1
Ireland	35.3	Luxembourg	no data
% Increase Needed for Ireland to Reach SAOE Average	23.2	% Increase Needed for Ireland to Reach SAOE Average	47.0

* Given that 2018 saw Ireland's Food manufacturing value-added falling substantially before bouncing back in 2019, we remove 2018 from Ireland's average. Nonetheless, Irish food manufacturing productivity remains particularly poor. Were 2018 data included, then real productivity would fall to €18.6 per hour.
** For Food manufacturing, the aggregate of Manufacture of food products; beverages and tobacco products was used to calculate annual average hours worked.

Construction

Employment in *Construction of Buildings* makes up 26.6 percent of total construction employment.

Real Value-Added per Hour: (€ GDP PPP)

Construction		Sub-Sector: Construction of Buildings **	
Norway	32.6	Ireland	43.4
Luxembourg	31.5	Denmark	42.7
Denmark	31.4	Luxembourg	40.3
Austria	31.2	Austria	38.1
Netherlands	30.2	Norway	36.8
Ireland	29.7	SOE	33.3
SAOE	29.0	Netherlands	31.1
Belgium	28.6	Sweden	26.9
Sweden	26.6	Finland	21.4
Finland	22.4	Belgium	no data
% Increase Needed for Ireland to Reach SAOE Average	Ireland in excess of SAOE average	% Increase Needed for Ireland to Reach SAOE Average	Ireland in excess of SAOE average

** For Construction of buildings, subsectoral data on hours worked was not available; hence, figures for the broader Construction sector were used to calculate annual average hours worked.

Wholesale & Retail

Employment in the *Retail Sector* makes up 59.4 percent of total wholesale & retail employment.

Real Value-Added per Hour: (€ GDP PPP)

Wholesale & Retail		Sub Sector: Retail	
Luxembourg	46.4	Denmark	23.4
Belgium	40.0	Norway	23.1
Denmark	32.9	Austria	23.1
SAOE	29.8	Finland	22.5
Netherlands	29.1	Netherlands	21.1
Norway	28.8	SAOE	21.1
Austria	28.3	Sweden	18.5
Finland	25.4	Ireland	17.3
Ireland	24.1	Belgium	no data
Sweden	23.9	Luxembourg	no data
% Increase Needed for Ireland to Reach SAOE Average	23.3	% Increase Needed for Ireland to Reach SAOE Average	22.0

Hospitality (Accommodation and Food Service activities)

Employment in the *Restaurant Sector* makes up 40.1 percent of total hospitality employment.

Real Value-Added per Hour: (€ GDP PPP)

Hospitality		Sub-Sector: Food and Beverage Services **	
Luxembourg	21.0	Luxembourg	19.9
Denmark	18.7	Denmark	16.4
Belgium	17.2	Sweden	16.0
Sweden	17.0	Norway	14.8
Netherlands	16.6	Netherlands	14.7
Austria	16.5	SAOE	14.3
SAOE	16.4	Finland	14.2
Norway	15.9	Austria	13.1
Finland	14.9	Ireland	12.3
Ireland	13.7	Belgium	no data
% Increase Needed for Ireland to Reach SAOE Average	19.8	% Increase Needed for Ireland to Reach SAOE Average	16.3

** For Food and beverage service activities, subsectoral data on hours worked was not available; hence, figures for the broader Accommodation and food service activities sector were used to calculate annual average hours worked.

Transport & Storage

Employment in the *Land Transport* sector makes up 60.2 percent of total transport & storage employment.

Real Value-Added per Hour: (€ GDP PPP)

Transport & Storage		Sub-Sector Land Transport	
Luxembourg	50.5	Norway	34.6
Denmark	49.9	Denmark	32.4
Belgium	42.1	Luxembourg	30.2
Norway	41.7	Netherlands	28.6
SAOE	35.9	Austria	27.5
Netherlands	35.7	SAOE	26.8
Austria	35.6	Finland	23.1
Ireland	29.6	Sweden	22.6
Finland	26.6	Ireland	19.3
Sweden	26.4	Belgium	no data
% Increase Needed for Ireland to Reach SAOE Average	21.5	% Increase Needed for Ireland to Reach SAOE Average	38.7

Information and Communication

Employment in the *Computer Programming & Consultancy* sector makes up 54.2 percent of total information and communication employment.

Real Value-Added per Hour: (€ GDP PPP)

Information & Communication		Sub-Sector: Computer Programming and Consultancy **	
Luxembourg	79.8	Denmark	42.6
Belgium	49.6	Belgium	40.1
Norway	47.9	Norway	39.9
Denmark	45.3	Finland	36.5
SAOE	41.8	SAOE	36.3
Sweden	41.2	Netherlands	35.1
Finland	40.4	Sweden	35.0
Netherlands	38.3	Ireland	34.5
Ireland	36.1	Austria	33.6
Austria	34.6	Luxembourg	no data
% Increase Needed for Ireland to Reach SAOE Average	15.7	% Increase Needed for Ireland to Reach SAOE Average	5.2

** For Computer programming, consultancy and related activities, the aggregate of Computer programming, consultancy, and information service activities was used to calculate annual average hours worked.

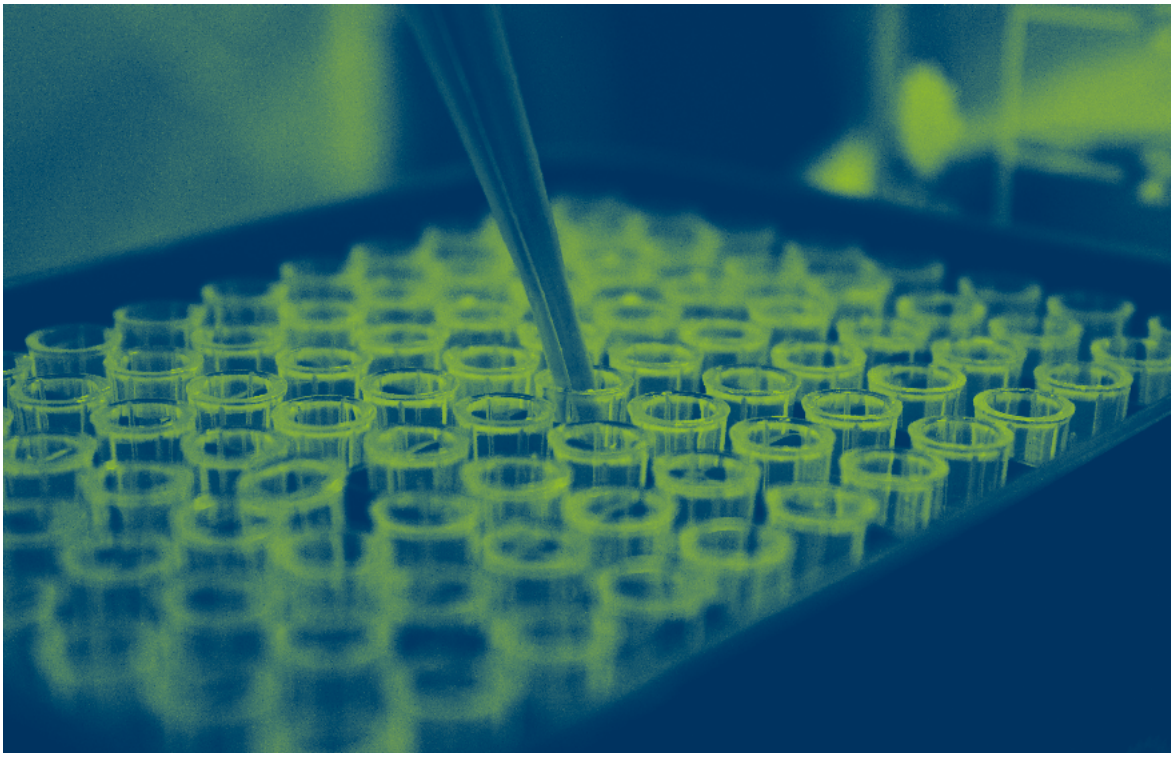
Professional & Scientific

Employment in the *Head Office activities and Management Consultancy* sector makes up 19.4 percent of total professional and scientific employment.

Real Value-Added per Hour: (€ GDP PPP)

Professional & Scientific		Sub-Sector: Activities of Head Offices & Management Consultancy **	
Denmark	43.5	Ireland	75.8
Ireland	41.2	Luxembourg	50.0
Norway	40.5	Denmark	44.2
Netherlands	34.1	Norway	39.2
SAOE	33.6	SAOE	37.2
Sweden	33.5	Austria	35.2
Belgium	30.4	Netherlands	34.4
Austria	29.8	Sweden	34.1
Finland	29.1	Belgium	33.5
Luxembourg	no data	Finland	30.5
% Increase Needed for Ireland to Reach SAOE Average	Ireland in excess of SAOE average	% Increase Needed for Ireland to Reach SAOE Average	Ireland in excess of SAOE average

** For Activities of head offices; management consultancy activities, the aggregate of Legal and accounting activities; activities of head offices; management consultancy activities; architectural and engineering activities; technical testing and analysis was used to calculate annual average hours worked.



Adjusted Administrative Services Sector

The *Administrative Services Sector* is adjusted by removing 'Rental and leasing activities' (primarily aircraft leasing) from Irish value-added. Employment in the Employment Activities makes up 39.3 percent of total adjusted administrative services employment.

Real Value-Added per Hour: (€ GDP PPP)

Adjusted Administrative Services		Sub-Sector: Employment Activities	
Norway	29.7	Austria	24.9
Austria	28.4	Norway	24.4
Belgium	27.7	Denmark	20.7
Denmark	25.9	Finland	19.1
SAOE	22.9	Sweden	17.6
Finland	21.2	SAOE	15.3
Ireland	20.7	Ireland	15.3
Sweden	19.6	Netherlands	11.9
Netherlands	17.8	Belgium	no data
Luxembourg	no data	Luxembourg	no data
% Increase Needed for Ireland to Reach SAOE Average	10.6	% Increase Needed for Ireland to Reach SAOE Average	0

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