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Executive Summary

Economic analysis by the Department has increasingly focused on assessing the potential and emerging impact of the so-called 4Ds (digitalisation, de-globalisation, demographics, and decarbonisation) on the Irish economy. The second iteration of the Department's Economic Insights series this year contains three notes that analyse the ongoing impact of some of these megatrends. The first two notes examine key trends in the multinational sector, focusing on the recent surge in investment in AI-related machinery and equipment, as well as the evolution of Ireland's participation in global value chains. The final note examines the international policy response to population ageing, considering potential lessons for Ireland.

The **first note** looks at recent evidence of high-tech investments in data centres and hardware associated with artificial intelligence (AI). Recent national accounts data points to a surge in investment in machinery and equipment in the second half of 2025, which appears to be associated with data centres. The note looks at Ireland's trade in a subcomponent of computer hardware, classified as 'AI related'. These data show both a surge in imports to, and exports from Ireland of these goods, suggesting that as well as being a data centre hub Ireland may also be a logistics or engineering location for operators. The impact of high-tech, concentrated investments on even modified measures of Ireland's economy, reflects the need for continued caution in interpreting macroeconomic statistics.

The **second note** explores Ireland's participation in global value chains, looking beyond the traditional metrics of exports and imports to where export and import dependencies lie. Ireland is among the most backwardly integrated economies in the euro area, meaning that a high proportion of Irish exports are reliant on foreign inputs. This creates risks for the sustainability of exports, particularly against the backdrop of a more fragmented geo-economic environment. Perhaps more significantly, Irish value chains are disproportionately more integrated with extra-EU countries - the US and China in particular. Value chains related to computer service exports, in particular, are relatively integrated with the US, while Ireland exports a high degree of intermediate computer and electrical products to China for further manufacturing. Another notable finding is that despite the significant level of imports of intellectual property in recent years, the domestic value-added share in Irish exports has remained flat over time.

Lastly, the **third note** examines policies implemented to address the impacts of population ageing in other countries, considering potential lessons for Ireland. While Ireland currently has a relatively young population, it is set to age rapidly over the next few decades due to declining fertility rates and rising life expectancy. Population ageing in Ireland will have implications for economic growth, the labour market, consumption, and the public finances. Many other countries are already dealing with these impacts and have responded with pro-natalist interventions, policies to increase labour force participation and reforms to reduce healthcare costs. Examining these policies provides insight into how Ireland could adapt its pensions, healthcare systems and labour market to accommodate demographic change while a window of opportunity remains.

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[1] The data and analysis set out in this document are compiled by Department of Finance staff. Every effort is made to ensure accuracy and completeness. When errors are discovered, corrections and revisions are incorporated into the digital edition available on the Department's website. Any substantive change is detailed in the online version.

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Rise of the Modified Machines: Investment in AI-related hardware in Ireland[2]

1.1 Introduction

Artificial intelligence (AI) has been widely touted as a potentially transformative technology with profound potential impacts on the economy, labour markets and society. The development and deployment of AI and related technologies has been underpinned by investment in computer hardware – i.e. the physical machines that provide the necessary computing power, data storage and other services for AI systems. Such is the demand for computing power generated by the rapid diffusion of AI that it has generated macroeconomically significant levels of investment in AI infrastructure in recent years.

This note looks at recent evidence which suggests that Ireland's economy has, in recent quarters, been a beneficiary of the AI infrastructure boom. In particular, this *Insight* builds on evidence detailed in the Department's *Annual Progress Report*[3] detailing a significant increase in Irish trade associated with AI hardware. Looking beyond the immediate investment, these additions to the capital stock may generate significant exports of AI-related services over the coming period. More generally, the ability of concentrated sector-specific investments to materially affect even modified measures of the Irish economy speaks to the ongoing challenges of interpreting Irish macroeconomic statistics.

1.2 Background

Investment in computer hardware globally has seen a boom in recent years driven, in part, by demand arising from the emergence and widespread adoption of AI technologies, such as Large Language Models. Investment in this hardware and the associated data centres has risen substantially in recent years, most notably in the United States, where investment in data centres is estimated to have tripled since 2022. Taking investment in data centres together with software and R&D spending, economists at the Federal Reserve Bank of St. Louis estimate that AI related categories made up nearly 40 per cent of US GDP growth in the first three quarter of 2025[4].

Investment in computer hardware is a key component of modified machinery and equipment i.e. excluding investment related to aircraft leasing. This category tends to be dominated by the activities of multinational enterprises and has shown particular volatility in recent years (**figure 1a**). In the final quarter of 2025, investment in machinery and equipment increased by close to 50 per cent in annual terms and accounted for over one quarter of overall growth in Modified Domestic Demand (MDD), with detailed data from Eurostat showing that investment in ICT equipment more than doubled in the final quarter of 2025 (**figure 1b**).

Indeed, Ireland has, since the 2010s, become a significant location for the construction of new data centres in Europe. Ireland hosts operations for a number of so-called 'hyperscaler' firms who operate IT and AI infrastructure while Dublin, in particular, is included in the 'FLAP-D' (which also includes Frankfurt, London, Amsterdam and Paris) group of major centre hubs. As a result, data centres in Ireland now account for a significant portion of electricity usage, with limitations and restrictions having now being placed on the development of new data centres in response to infrastructure constraints.

1.3 Trade data

Previous analysis of investment in Machinery and Equipment in Ireland has looked at trade data as a leading indicator and as a source that can highlight the contributions of large, sector-specific investments to aggregate growth. As a small economy, Ireland imports the vast majority of specialised machinery and equipment and as such, the detailed breakdown of machinery imports available in trade data can point to ongoing investment in specific industries.

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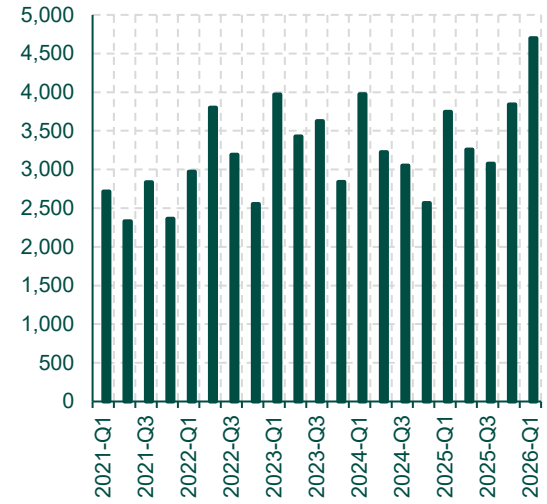
[2] This note was prepared by Éamonn Sweeney, an economist in the Department of Finance. The analysis and views set out are those of the author and do not necessarily reflect the views of the Department of Finance or Minister for Finance.
[3] See Box 3: Rise of the (modified) machines – investment in AI hardware in *Annual Progress Report,* April 2026, https://assets.gov.ie/static/documents/df0a7a0f/Rise_of_the_modified_machines_-_investment_in_AI_hardware.pdf
[4] H. Rubinton and B. A. Patro. Tracking AI's Contribution to GDP Growth. St. Louis Fed on the Economy, Jan. 12, 2026, https://www.stlouisfed.org/on-the-economy/2026/jan/tracking-ai-contribution-gdp-growth

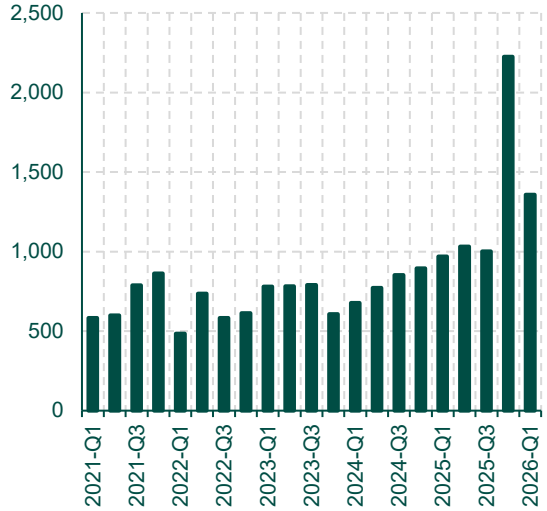
Figure 1: Volatility in machinery and equipment investment

a: Modified M&E investment, € mn



Source: CSO

b: Investment in ICT equipment, € mn



Source: Eurostat.

Looking at investment in the hardware used for data centres and AI applications, it is necessary to try to disentangle consumer and everyday business computer equipment from that used in data centres. Looking at the effects of AI on global trade, research by the Federal Reserve highlights three trade categories as 'AI-related hardware' (**table 1**). De Soyres et al.[5] note while there is some difficulty in precisely identifying AI-related trade, that these three components are 'directly tied to the buildout of AI computing capacity' and include servers, graphics cards and other hardware used in data centres. These goods have been associated with an enormous increase in global trade flows in recent years, increasing by 65 per cent on an annual basis in H1 2025.

Table 1: AI Related Trade Categories

CN Code	Technical Description	Example Products
84715	Units of automatic data processing machines; processing units other than those of item no. 8471.41 or 8471.49	NVIDIA DGX server
84718	Other Units of Automatic Data Processing Machines	NVIDIA HGX server baseboards
84733	Parts and accessories of the machines of heading 8471.	NVIDIA GeForce RTX Graphics Cards

Source: de Soyres et al. (2026), Global Trade Effects of the AI Infrastructure Boom, FEDS Notes.

This research also highlights that trade in AI-related goods has tended to originate from a small number of trading partners, in particular Taiwan, as well as Mexico and Vietnam. In the case of Taiwan, this reflects its central role in the manufacturing of advanced semiconductors, while Mexico and Vietnam appear to be involved in combining semiconductors with less costly components to assemble servers.

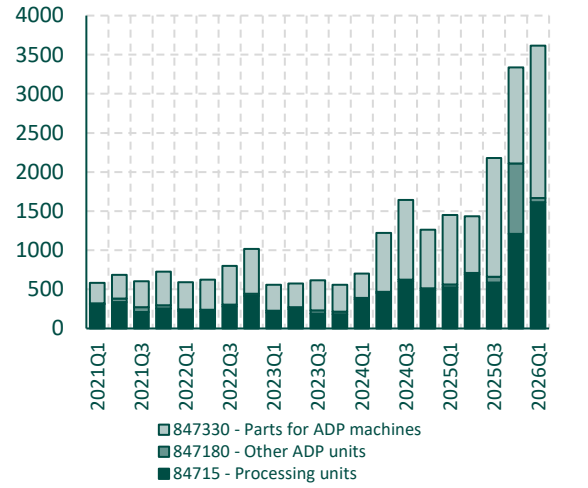
Looking at detailed trade data from Eurostat for Ireland, there has been a significant increase in imports of these AI-related goods from the second half of 2025 onwards and this has continued into the first quarter of 2026. This surge in imports is consistent with the pick-up in modified machinery and equipment seen in the final quarter of last year and would point towards the fitting out of new data

[5] de Soyres et al. (2026), Global Trade Effects of the AI Infrastructure Boom, FEDS Notes, https://doi.org/10.17016/2380-7172.3994.

centres or the upgrading of existing data centres present in Ireland (**figure 2a**). In line with research focussing on the United States, these imports are also concentrated by partner country, with Taiwan making up the vast majority of these imports but there has also been a significant pick up in trade in AI-related goods from both Mexico and Vietnam (**figure 2b**).

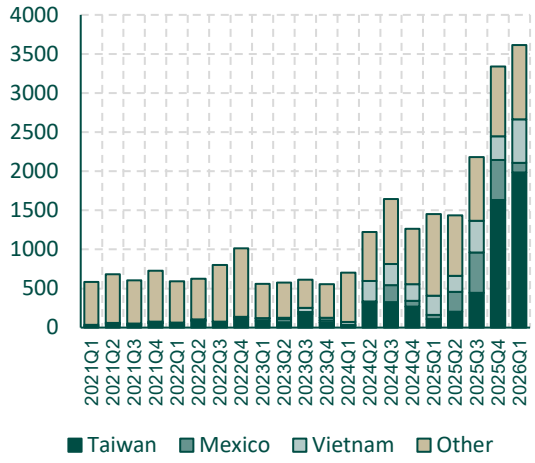
Figure 2: Trade in AI-related hardware

a: Imports of AI related hardware, € mn



Source: Eurostat

b: Imports of AI related hardware, € mn



Source: Eurostat

As well as hosting data centres, Ireland hosts other operations, including engineering, logistics and manufacturing operations for large firms in the ICT sector, including hyperscaler firms. If Ireland is not the ultimate destination for these AI-related goods this would be reflected in a corresponding expansion of exports. While exports of these goods have also recorded strong growth over recent quarters, in particular, in 2026 Q1, on a quarterly basis Ireland appears to still be a significant net importer of these goods (**figure 3a**). This suggests that while there are significant outflows, Ireland is likely the ultimate destination for a significant proportion of these goods. It is also possible that the exports could relate to depreciated equipment from existing data centres being replaced by newer higher value equipment.

Another apparent feature of AI-related hardware is its relative weight. Industry reports suggests that due to the higher density of computing power AI-specific server racks are significantly heavier than traditional cloud computing equipment. This increased weight has apparently posed problems for data centres operators where floors and foundations must be reinforced for new hardware[6]. While it is not possible to break down the unit weight of trade categories in Eurostat or CSO trade data, this can be computed using customs data from the Taiwanese Ministry of Finance. On this basis, it would appear that the unit weight of some AI-related products being exported to Ireland increased last year (**figure 3b).** This tentatively supports the conclusion that these hardware products are being used for AI although the increase comes off of a previously small volume of exports to Ireland in this category.

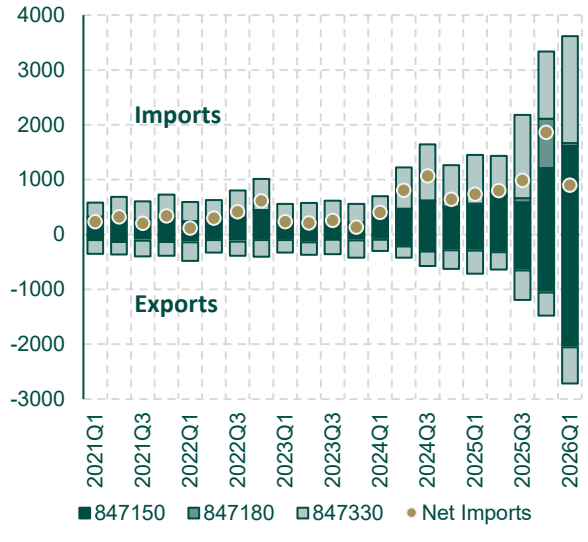
1.4 Wider macroeconomics implications of AI investment

Beyond the short-run implications of the build-out of AI infrastructure for investment, these assets are expected to contribute to output through capital services. The construction of AI data centres is ultimately intended to facilitate the sale of AI and computer services. As an economy with a small domestic market for such services, it is reasonable to assume that this investment in computing power will see a corresponding increase in exports of computer services.

[6] Welle, E. (2025). Racks of AI chips are too damn heavy, The Verge, Dec. 16, 2025, https://www.theverge.com/ai-artificial-intelligence/844966/heavy-ai-data-center-buildout

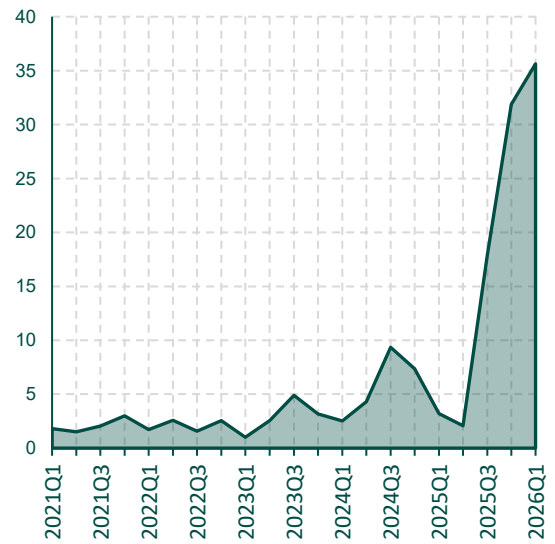
Figure 3: Trade Flows and Unit Weights of AI related products

a: Trade flows of AI related goods, € mn



Source: Eurostat

b: Unit weight, Other ADP units, TW exports to IE



Source: Taiwan Ministry of Finance.
Note: Unit weight (kg) of Other Automatic Data Processing units

The potential impact from data centres on output is difficult to quantify given firm and service-specific factors that might influence the quantity of capital services derived from a given investment. However, industry reports suggest that there continues to be extremely strong demand for computing services and this is reflected in growing prices for renting of computing power. An illustrative example of this is presented in analysis by Carpinelli et al (2026)[7], which breaks down the capital costs, operating costs and rental prices of a typical server rack used in AI computing (**figure 4a**). This analysis suggests that the flow of revenue associated with AI services may rapidly exceed the capital expenditure involved.

A further consideration associated with investment in data centres and AI is the replacement cycles of the hardware involved. Unlike buildings or manufacturing machinery, Carpinelli et al (2026) highlight that AI hardware may have relatively short life cycles both because of obsolescence through the arrival of more advanced hardware but also through physical wear and tear if the hardware is intensively utilised. In public filings, major hyperscale firms estimate the lifecycle of servers and networking equipment of between 3 and 6 years[8]. Such relatively short economic lives may mean investment in computer hardware remains structurally higher, as firms continuously replace their existing equipment.

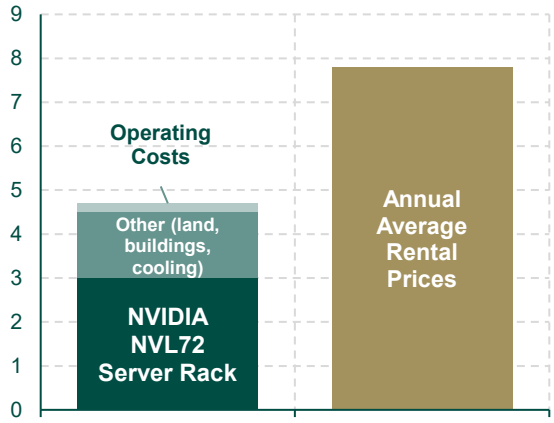
Looking forward, the outlook for future investment in data centres in Ireland is somewhat uncertain. A previous *Insight* highlighted how regulatory changes had restricted some new data centre activity in Ireland[9]. In the short term, however, there does appear to be a continued pipeline of investment in data centres in Ireland. Indeed, data on 'starts' indicate that a number of large data centre projects having commenced in recent quarters, which suggests that there may continue to be new investment in this sector over the coming years (**figure 4b**).

[7] Carpinelli et al. (2026), Artificial Intelligence and the US Economy: An Accounting Perspective on Investment and Production, https://arxiv.org/abs/2601.11196v1.
[8] Weil, Jonathan. "The Accounting Uproar over How Fast an AI Chip Depreciates." *The Wall Street Journal*, 8 Dec. 2025, www.wsj.com/finance/investing/the-accounting-uproar-over-how-fast-an-ai-chip-depreciates-6f59785b.
[9] "Concrete Signals? New Industrial Investment in the Irish Economy" in *Economic Insights* Volume 3, 2025. Department of Finance. https://assets.gov.ie/static/documents/5216ee2a/Economic_Insights_Volume_3_2025_final_1.pdf

More generally, the apparent significant contribution of data centres to investment in modified machinery and equipment, and by extension MDD in the second half of 2025 raises issues about interpreting adjusted measures of Irish economic activity. Indeed, Casey (2023), highlights the possibility that "sizeable investments by individual multinationals could result in outsized impacts [on MDD] from time to time"[10]. While investment in data centres reflects physical additions to Ireland's capital stock, much of this capital is likely to have been imported while its direct impact on employment is expected to be relatively limited. If even bespoke measures of the Irish economy, like MDD, are heavily influenced by a single industry which may be extremely capital intensive and has relatively little connection to the wider economy or labour market, then they should be interpreted with caution as indicators of domestic activity. This underscores the potential value of publishing more comprehensive metrics, such as GNI*, on a quarterly basis.

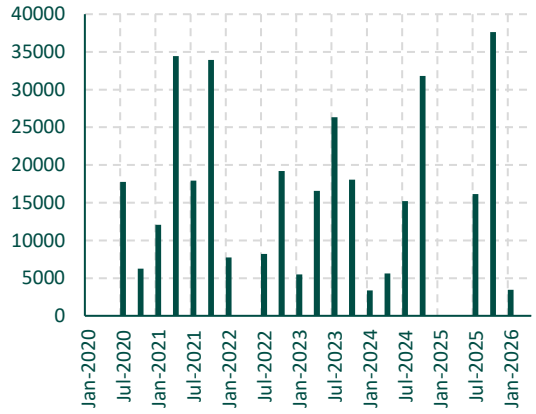
Figure 4: Forward looking indicators of data centre activity

A: Rental prices / costs for selected AI hardware, $ million



Source: Carpinelli et al (2026)

B: New data centre starts, square metres



Source: Building Control Management System, Authors' calculations.

1.5 Conclusion

The data presented in this *Insight* points to a notable increase in investment in Machinery & Equipment, in particular ICT equipment in the second half of 2025. Drawing on the international literature on the AI investment boom, three categories of goods associated with AI hardware are identified, together with trading partners associated with the build out of data centres. These data point to a significant increase in imports of this hardware in the final quarter of 2025, which has continued into early 2026. While Ireland has also seen strong export growth in AI-related hardware, the evidence suggests that a significant portion of the growth in modified machinery and equipment has been associated with the build out of AI infrastructure in Ireland, in line with patterns seen in the U.S. Beyond the immediate impact on investment, data centres and AI-related infrastructure are likely to lead to a corresponding increase in exports of computer services.

Looking forward, despite infrastructure constraints evidence suggests that there continues to be a pipeline of new data centre activity that may sustain further investment. More generally this research highlights the ongoing limitations of bespoke measures of economic activity like MDD, in the presence of large, concentrated investments, such as those in data centres.

[10] Casey, E., (2023). "Ireland's modified domestic demand: why we should be cautious interpreting it". Irish Fiscal Advisory Council Analytical Note Series No. 19.
https://www.fiscalcouncil.ie/wp-content/uploads/2023/05/Analytical-Note-Modified-Investment-Eddie-Casey-May-2023.pdf

Ireland's participation in Global Value Chains[11]

2.1 Introduction

Ireland's strong export performance through recent global shocks masks a more complex external exposure. As Gopinath et al. (2024)[12] show, trade and FDI flows are increasingly being shaped by geopolitical alignment, suggesting that future shocks may operate through the reorganisation of production networks rather than through demand shocks alone.

This is particularly relevant for Ireland, where exports are deeply embedded in multinational value chains, imported intermediates, contract manufacturing and IP-related activity. These features may have supported recent resilience, but they also mean that Ireland's export outlook depends on the structure and stability of global production networks. Against this backdrop, this note considers Ireland's participation in GVCs using Eurostat's FIGARO data which provides insight into the origin of inputs and domestic value-added contribution to Irish exports across sectors.

A number of key findings are notable. Ireland's exports are among the most backwardly integrated in the euro area, which means that Irish exports are relatively exposed to production at earlier stages in the supply chain i.e. the import content is relatively high. However, unlike Ireland's euro area counterparts, Ireland's exports are uniquely exposed to both downstream and upstream value chain developments in non-EU countries. In other words, value chains associated with Irish exports are relatively less integrated with other EU countries. In addition, the FIGARO data suggests that the domestic value added contained in Ireland's exports has remained relatively steady in recent years and has even declined somewhat over the last decade. This is somewhat surprising given the significant level of intellectual property imports over this period, which, all else equal, would be expected to increase domestic value add i.e. lower the import content of Irish exports. Ultimately, high GVC participation suggests that standard measures of trade-weighted foreign demand may provide an incomplete guide to Irish export performance. This suggests that changes in the structure of global production networks may be as important to Irish exports as global demand.

2.2 Data

Conventional trade data capture the total value of goods and services that flow between countries. In contrast, examining trade from a value-added perspective measures the contribution from each country along the value chain in the production of exports. This allows for an assessment of a country's position in global value chains as well as the potential exposure of aggregate and sectoral trade to links further back or forward in the value chain.

One dataset which enables analysis of trade in this way is Eurostat's FIGARO data.[13] In particular, this note explores two key measures of global value chain participation from an Irish perspective:

- **Backward linkages** measure the foreign value added used in the production of Irish exports. This indicator can be considered a measure of the 'import content of exports' and gives a sense of where import dependencies lie.
- **Forward linkages** measure the Irish value added used in the production of other countries' exports. This indicator can highlight export dependencies, i.e. where a change in demand for another country's exports may have knock-on implications for Irish exports.

[11] This note was prepared by Dáire de hÓra, an economist in the Department of Finance. The analysis and views set out are those of the author and do not necessarily reflect the views of the Department of Finance or Minister for Finance.
[12] https://www.imf.org/en/publications/wp/issues/2024/04/05/changing-global-linkages-a-new-cold-war-547357
[13] https://ec.europa.eu/eurostat/web/products-eurostat-news/-/edn-20210526-1. As a sense-check, FIGARO data were cross-checked with the OECD's TiVA database. While year-to-year movements in estimates of foreign-valued added in exports can vary across both datasets, both sources estimate broadly similar ratios across time.

Compilation of FIGARO requires data from various sources and involves several steps and data adjustment[14], which can give rise to large discrepancies between the FIGARO data and the national accounts data. Nonetheless, FIGARO is useful as a complement to the conventional trade data for analysing trade from a GVC perspective. It is also worth noting that this data, like the national accounts, is impacted by contract manufacturing and other globalisation-related distortions for Ireland.

2.3 Overview of Irish GVC participation

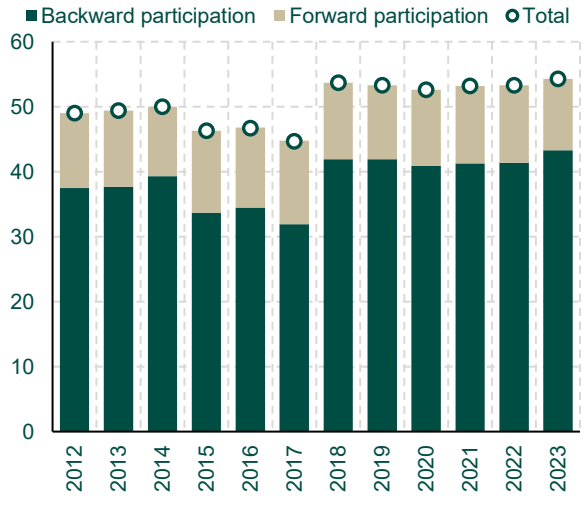
GVCs can be defined as the full range of cross-border activities required to bring a product from its conception to its end use and beyond. Although integrating into global value chains offers many benefits - allowing countries to specialise in areas of comparative advantage and providing greater access to inputs - it also increases an economy's exposure to external risks.

Latest data show that Ireland's total participation in global value chains, measured as the sum of forward participation and backward participation, stood at over 54 per cent in 2023 (**figure 5a**). In broad terms, Ireland's GVC participation has increased over the past decade, although a decline was recorded between 2014 and 2017 reflecting a fall in backward participation over this period.[15]

Ireland's participation in GVCs is characterised by stronger backward participation than forward participation. In other words, Ireland is more integrated into GVCs as a user of foreign inputs than as a supplier of inputs into foreign exports. In terms of exposure to supply chain disruptions, Ireland's higher than average backward participation indicates that Ireland is relatively dependent on imported inputs to produce its exports. On the other hand, Ireland's measured forward participation is relatively low. However, this should be interpreted cautiously given the importance of multinational production structures, contract manufacturing and IP-related flows. These features mean that Irish exports may be linked to global production networks in ways not fully captured by conventional forward-participation measures.

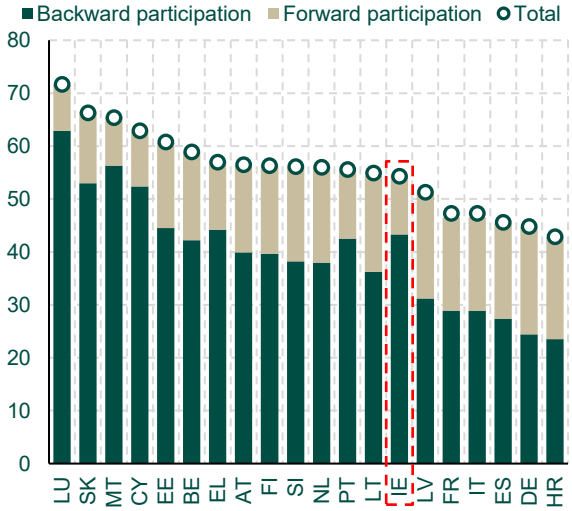
Figure 5: Irish GVC participation

a: Irish GVC participation, per cent of exports



Source: Eurostat FIGARO data and author's calculations

b: 2023 GVC participation, euro area, per cent of exports



Source: Eurostat FIGARO data and author's calculations

Other euro area countries also have stronger backward linkages than forward linkages (**figure 5b**). In particular, backward participation generally makes up a greater share of total participation for smaller

[14] For more information, see: https://ec.europa.eu/eurostat/cache/metadata/en/naio_10_fcp_esms.htm.
[15] This is consistent with the significant onshoring of intellectual property over this period which, all else equal, would lower the import content in Irish exports.

countries, reflecting the fact that smaller countries have fewer domestic resources available to use in the production of their exports.

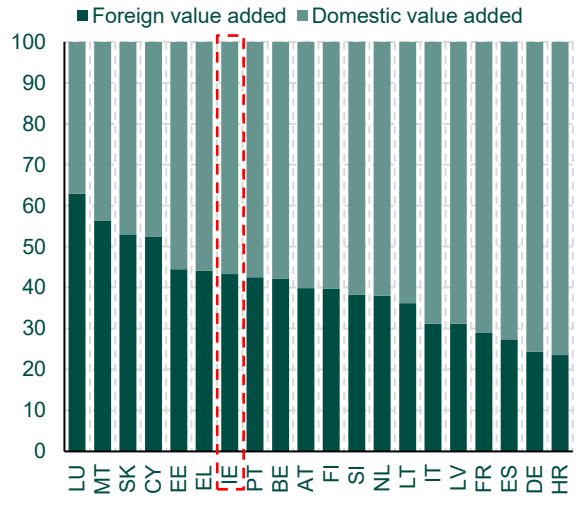
Although these indicators measure Ireland as having relatively low forward GVC participation, it should be noted that this measure of forward participation only captures intermediate exports *which are used as inputs into further exports*. In other words, it does not capture intermediate inputs used in the production of goods and services that are consumed or invested domestically. The data show that more than half of Irish exports were intermediate products in 2023, which suggests that - while Ireland exports significant levels of intermediate products - it is often the case that these are then finalised in the immediate country to which they are exported. For example, in the pharma sector Irish firms often export the active ingredients for pharmaceutical products to the US where the goods are then finalised and consumed.

2.4 Backward GVC participation

In 2023, the foreign value added in Irish exports was measured at 43 per cent of exports, the seventh highest in the euro area (**figure 6a**). In general, the EU is the main source of inputs into the exports of euro area countries (**figure 6b**). In contrast, the US was the main source of inputs into Irish exports in 2023, followed by the EU. This reflects the presence of US multinationals in Ireland, with these companies likely sourcing inputs from the US to a greater extent than other companies. Inputs from the US are likely to be primarily services rather than goods – national accounts data show that the bulk of Irish imports from the US are royalty payments for the use of intellectual property.

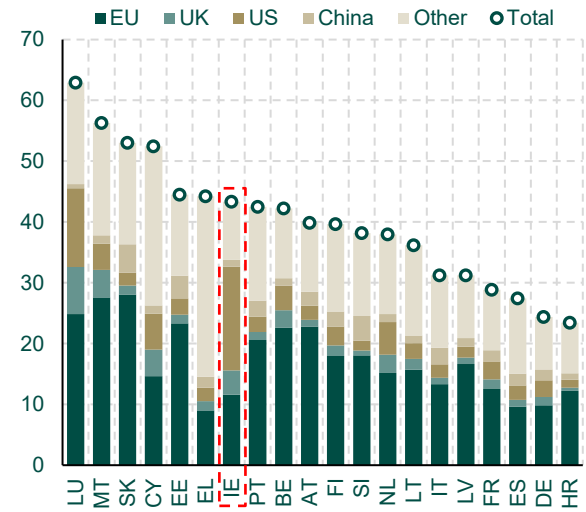
Figure 6: Backward GVC participation in the euro area

a: 2023 value added in exports, % of exports



Source: Eurostat FIGARO data and author's calculations

b: 2023 backward participation, % of exports



Source: Eurostat FIGARO data and author's calculations

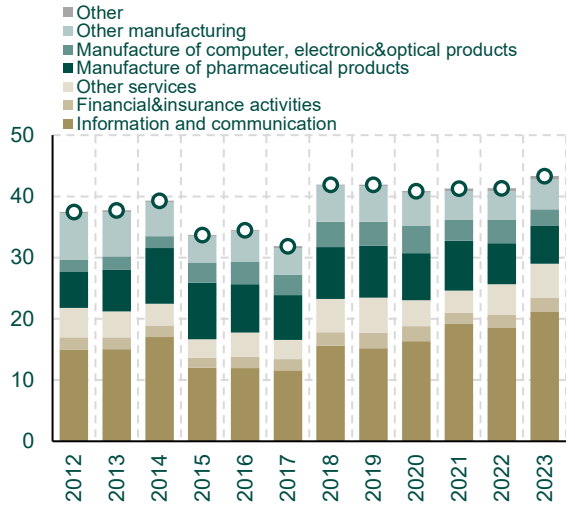
The main sectors contributing to Irish backward participation are information and communication services and manufacturing of pharmaceutical products (**figure 7a**) – both export-intensive sectors with a strong MNE presence in Ireland. The US is the main source of inputs across virtually all sectors, but the information and communication sector accounts for the majority of US inputs used in Irish exports (**figure 7b**).

Ireland's backward GVC participation has remained relatively stable since 2018, increasing marginally from around 42 per cent to just over 43 per cent in 2023. The contribution from service exports has increased since 2018, with growth in the share of foreign inputs used in service exports over this period.

By contrast, the share of foreign inputs used in manufacturing exports fell slightly over this period. Moreover, exports of services account for a growing share of total exports since 2018.

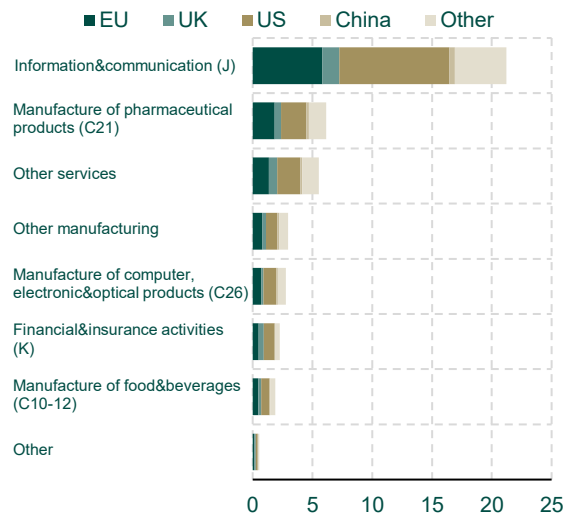
Figure 7: Irish backward GVC participation over time

a: Irish backward participation, per cent of total exports



Source: Eurostat FIGARO data and author's calculations

b: 2023 backward participation, per cent of total exports



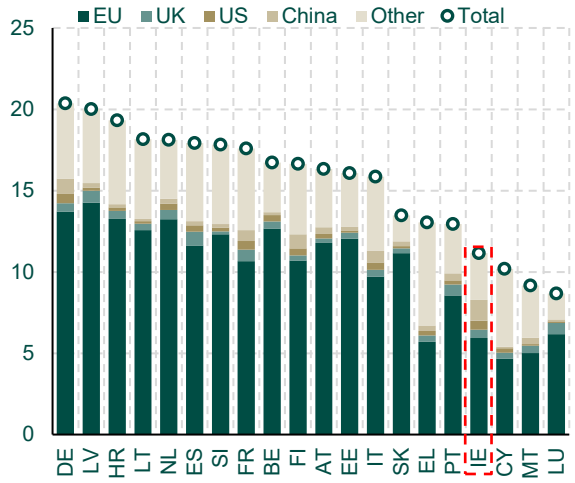
Source: Eurostat FIGARO data and author's calculations

2.5 Forward GVC participation

Ireland's forward GVC participation is one of the lowest in the euro area, with Irish value added used as inputs into our trading partners' exports measured at 11 per cent of Irish exports in 2023 (**figure 8a**). As mentioned, this is in line with other smaller euro area countries, which tend to have weaker forward GVC participation than backward participation. As is the case in other euro area countries, the EU is the largest user of Irish value added in its exports. Unlike other EU countries, however, Ireland has a higher share of domestic value added in Chinese exports.

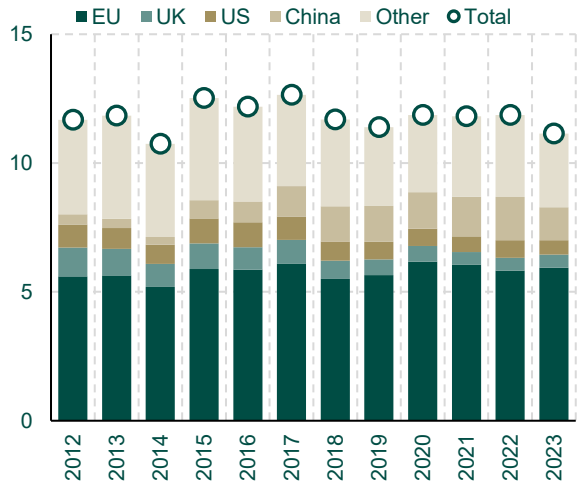
Figure 8: Forward GVC participation by trading partner

a: 2023 forward participation, euro area, per cent of exports



Source: Eurostat FIGARO data and author's calculations

b: Irish forward participation, per cent of total exports



Source: Eurostat FIGARO data and author's calculations

Ireland's forward participation has remained relatively steady over the past decade, but the composition of countries and sectors has changed over time. The EU has remained the most important trading partner for Irish forward participation since 2012 (**figure 8b**). China has become more important as a

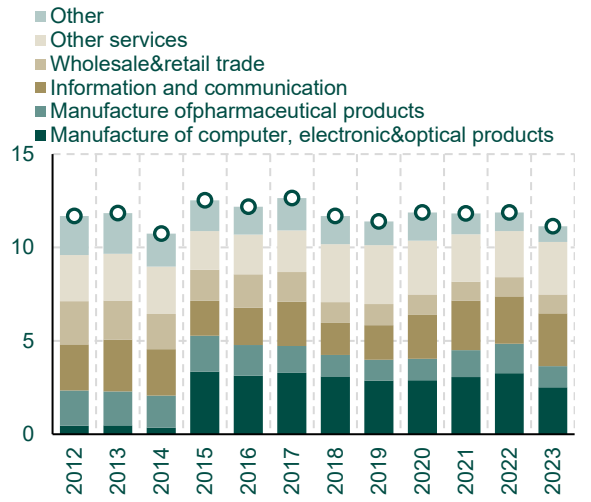
user of Irish inputs over time, while the contribution of the US and UK has decreased slightly in recent years.

The most notable development in Ireland's forward participation over the past decade is the sharp increase in the contribution of the computer, electronic and optical sector recorded in 2015 (**figure 9a**).[16] The 2015 increase and subsequent profile coincides with an increase of a similar magnitude in contract manufacturing exports indicating that a considerable share of these exports are recorded in the FIGARO data as intermediate exports between third parties. In 2023, this sector accounted for almost a quarter of Ireland's total forward GVC participation, compared to just 4 per cent in 2014.

Examining the contribution of trading partners to the forward participation of selected sectors reveals that China is a key user of Irish exports of computer, electronic and optical products in its own exports (**figure 9b**).[17] Across other sectors, the EU is generally the largest user of Irish inputs in its exports. The largest contribution from the US is in the pharmaceutical sector, reflecting Irish exports of pharmaceutical ingredients or unfinished products for further manufacturing and export in the US.

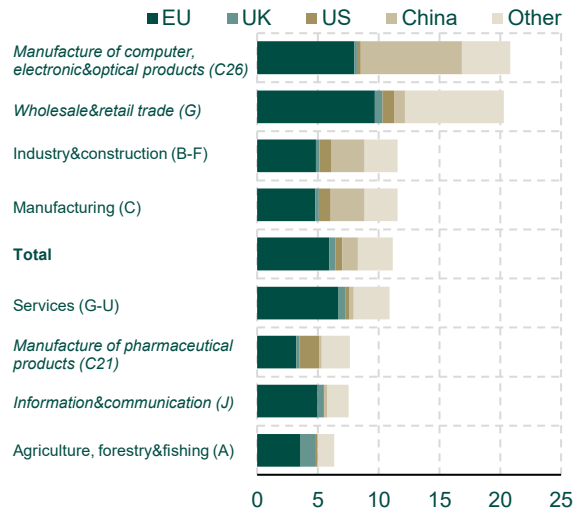
Figure 9: Forward GVC participation by sector

a: Irish forward participation, per cent of total exports



Source: Eurostat FIGARO data and author's calculations

b: 2023 forward participation, per cent of sector exports



Source: Eurostat FIGARO data and author's calculations

2.6 Domestic value added in Irish exports

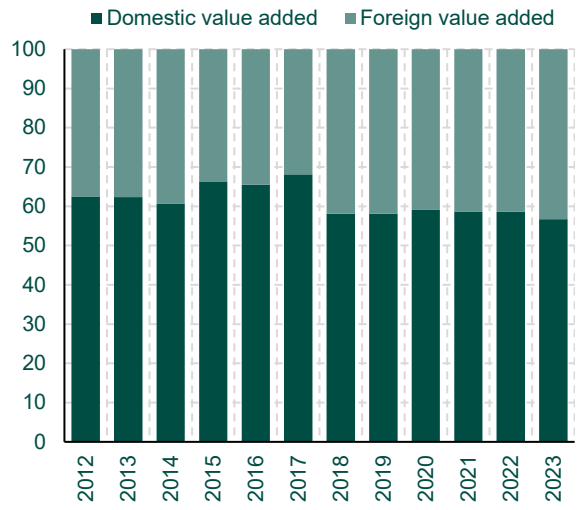
In 2023, the foreign value added in Irish exports (or the import content of exports) was estimated at 43 per cent, with domestic value added making up the remaining 57 per cent of Irish exports (**figure 10a**).

Disaggregating exports into their foreign and domestic value added in this way is useful for understanding the contribution of exports to the domestic economy. In Ireland's case, given the significant presence of multinationals here, a large portion of this value added will ultimately flow out of the economy via profit repatriations to foreign owners. Nonetheless, the production of exports in Ireland contributes to the domestic economy through related employment and tax receipts. Although the domestic value-added share has remained relatively steady in recent years, exports have continued to record significant growth over this period, implying an increasing contribution of exports to Irish GDP over time.[18]

[16] Contract manufacturing occurs where a company in Ireland engages a company abroad to manufacture products on its behalf. As the Irish subsidiary has ownership over these products throughout the process, such exports are registered as Irish exports, despite the fact that they never cross Irish borders.
[17] Customs trade data shows that China accounted for over 40 per cent of electrical machinery (SITC77) exports in 2023.
[18] Exports recorded a decline in 2023 but were still more than 60 per cent above 2018 levels.

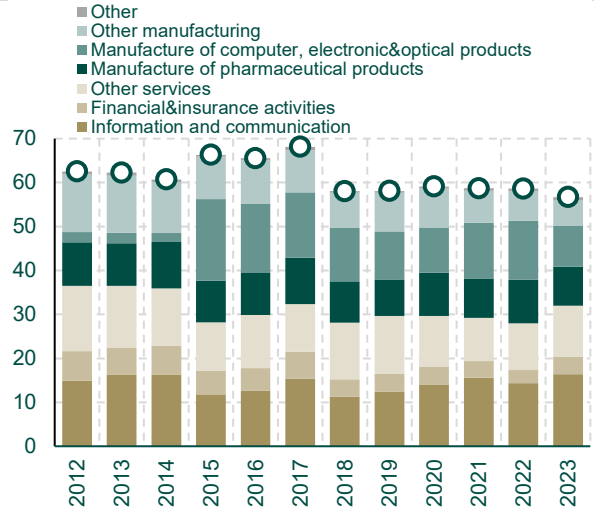
Figure 10: Domestic value added in Irish exports

a: Value added in Irish exports, % of exports



Source: Eurostat FIGARO data and author's calculations

b: 2023 domestic value added in exports, % of exports



Source: Eurostat FIGARO data and author's calculations

The increase in forward participation in the computer, electronic and optical sector recorded in 2015 is also reflected in this measure of domestic value added (**figure 10b**). This change coincided with a substantial onshoring of intellectual property (IP), and a surge in contract manufacturing exports and GDP.

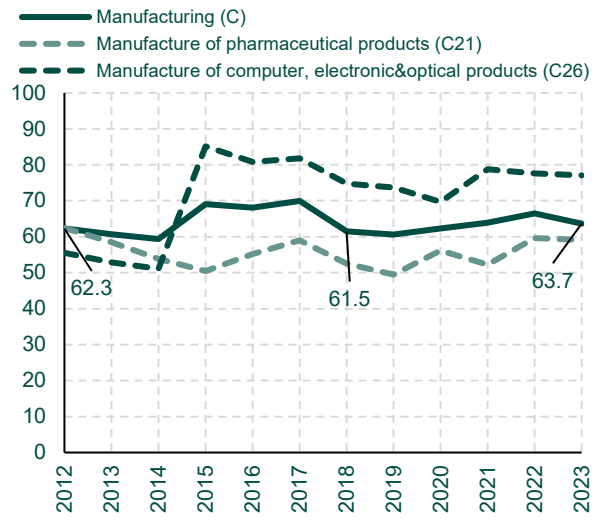
The domestic value added in exports varies significantly across sectors. In 2023, domestic value added accounted for almost 64 per cent of manufacturing exports (**figure 11a**). In other words, this data suggests that each euro of exports in the manufacturing sector contributes €0.64 to Irish value added. Within manufacturing, domestic value added accounted for 77 per cent of the computer, electronic and optical sector's exports in 2023 reflecting the significant role of contract manufacturing exports in this sector. This compares to 52 per cent for exports of services (**figure 11b**), with ICT service exports having a particularly low domestic value added intensity. The larger contribution of service exports to overall domestic value added is therefore reflective of the magnitude of service exports rather than a higher domestic value-added share in these exports (**figure 10b**).

As mentioned, the share of domestic value added in the computer electronic & optical products sector's exports increased sharply in 2015, following a large onshoring of IP. While the share of domestic value added was well above the pre-2015 share in 2023, it remained below its 2015 peak. Perhaps more puzzling is the fact that the share of domestic value added in exports in the information and communication services sector has decreased since 2017, despite large IP onshoring events over the past half decade.[19] It should be noted that while the *intensity* of domestic value added in information and communication exports has declined, the *nominal value added* is more than 4 times higher in 2023 than in 2012, undoubtedly linked, in part, to onshoring of IP.

[19] CSO data show significant growth in the stock of intellectual property products in both the manufacturing and ICT sectors, see: https://assets.gov.ie/static/documents/economic-insights-volume-3-2024.pdf
More generally, there is a notable decline in the value added across a number of key service sectors in 2018 which suggests that this may be attributable to methodological changes in the FIGARO dataset.

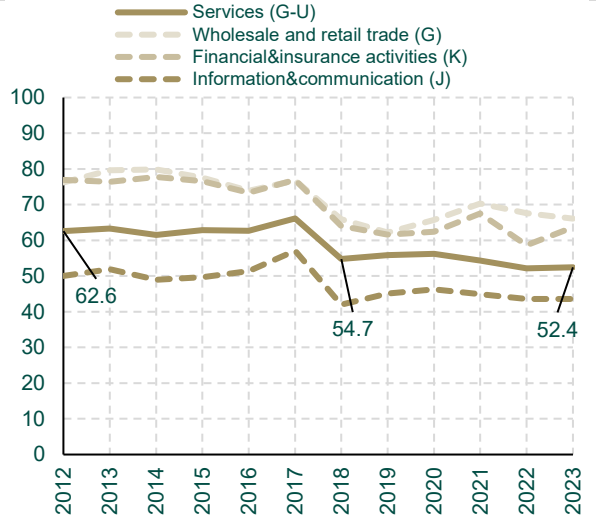
Figure 11: Domestic value added by sector

a: Domestic value added in manufacturing exports



Source: Eurostat FIGARO data and author's calculations

b: Domestic value added in service exports



Source: Eurostat FIGARO data and author's calculations

2.7 Conclusion

The Irish economy has become increasingly integrated into GVCs in recent years as Irish exports have continued to grow, with overall GVC participation in 2023 reaching its highest level since 2010. In line with other euro area countries, Ireland is more strongly integrated into GVCs as a user of foreign inputs in its exports rather than as a supplier of inputs into foreign exports. Indeed, Ireland has one of the highest levels of backward integration across euro area countries. While greater integration into the global economy has undoubtedly provided significant benefits to the Irish economy, it also entails greater exposure to external risks. Indeed, Ireland is vulnerable to external shocks or any transition away from global economic integration.

The main sectors contributing to Irish GVC participation are information and communication services, manufacturing of pharmaceutical products, and manufacturing of computer, electronic and optical products. This is unsurprising given the importance of these sectors for Irish exports more generally. In terms of trading partners, the US is a key source of inputs for Irish exports, while the EU is important both as a source of inputs into Irish exports and as a user of Irish inputs in its exports. Ireland also exports a higher share of intermediate goods to China for further export than its peers. In other words, unlike its euro area counterparts, Ireland is more integrated into extra-EU global value chains, making it acutely exposed to economic developments and trade policy outside of the trading bloc.

The data also provide an estimate of the domestic contribution to Irish exports. The computer and electronics manufacturing sector has a high domestic value-added intensity in its exports, whereas information and communication services are more reliant on foreign inputs, with exports in the sector containing a lower share of domestic value added. At an aggregate level, the share of domestic value added in exports has remained relatively steady in recent years. This is a noteworthy development given the significant investment in intellectual property over the past decade, which might have been expected to increase the share of value added.

Overall, domestic value added accounted for more than half of the value of Irish exports in 2023. This underscores the importance of exports to GDP, and the potential exposure of the Irish economy to changes in the international trade landscape within sectors.

Irish Population Ageing: The Land of Saints and Seniors[20]

3.1 Introduction

On average, people are living longer and, in general healthier lives. While rising life expectancy represents one of the crowning achievements of the last century, it also presents challenges. Population ageing puts pressure on systems that were created when life expectancy was much lower than today, such as social insurance, pension schemes, and social support models. Population ageing will also place downward pressure on economic growth and labour supply. As the pace of population ageing accelerates, several countries are adjusting policies to accommodate these impacts. The lessons learned from these countries are increasingly relevant for Ireland as the demographic shift towards an ageing population gains momentum.

3.2 Irish Forecasted Demographic Change

While Ireland has a relatively young population currently, it is set to age rapidly over the next few decades. Ireland has the highest proportion of persons aged 15 and under in the EU and second lowest proportion of individuals aged 65 and over. As such, Ireland's median age of population is favourable, at almost 40 years old in comparison to 45 years old in the EU. Ireland's relatively young demographic structure is a product of the large cohorts born between the late 1970's and 2000's, when Ireland had an above average birth rate.

However, over the next 40 years, Ireland's demographics are set to shift significantly due to declining fertility rates and rising life expectancy. This is discussed in the recently published *Demographic Outlook Report*[21] as part of *Future Forty*.[22] The report sets out potential population trajectories to 2065 based on varying assumptions regarding fertility rates and migration. It demonstrates that there will be a significant increase in the population aged 65 and over in Ireland alongside a decrease in the number of people aged 49 years old and under (**figure 12a**).

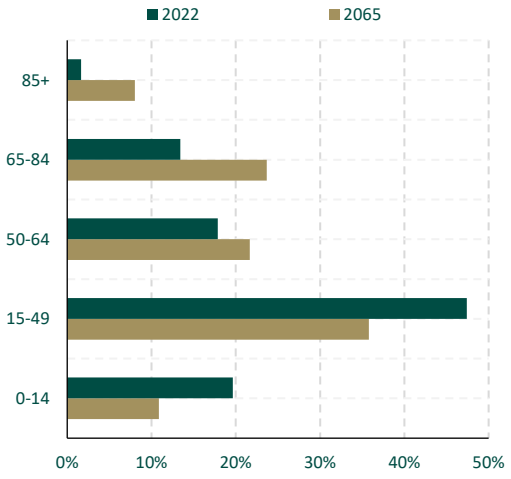
Given current policies, Ireland's ageing population will lead to significant increases in public spending for pensions, healthcare and long-term care. Future Forty projects that age-related expenditure (healthcare, long-term care pensions) will increase from 36 per cent of total voted expenditure in 2025 to over 46 per cent by 2065.

In addition, economic growth is expected to slow over time, with Future Forty projecting it will approach 0.5 per cent annually by 2065. This slowdown is attributable to demographic headwinds stemming from our rapidly ageing population, as well as an expected moderation in productivity growth.

[20] This note was prepared by Ciara O'Connor, an economist in the Department of Finance. The analysis and views set out are those of the author and do not necessarily reflect the views of the Department of Finance or Minister for Finance.
[21] For more information, see Future Forty: Ireland's Demographic Outlook, Department of Finance (September 2025). Available at:
https://www.gov.ie/en/department-of-finance/publications/future-forty-irelands-demographic-outlook/
[22] For more information, see Future Forty: A Fiscal and Economic Outlook to 2065, Department of Finance (November 2025). Available at:
https://www.gov.ie/en/department-of-finance/press-releases/minister-donohoe-publishes-future-forty-a-long-term-fiscal-and-economic-assessment-of-irelands-needs-out-to-2065/

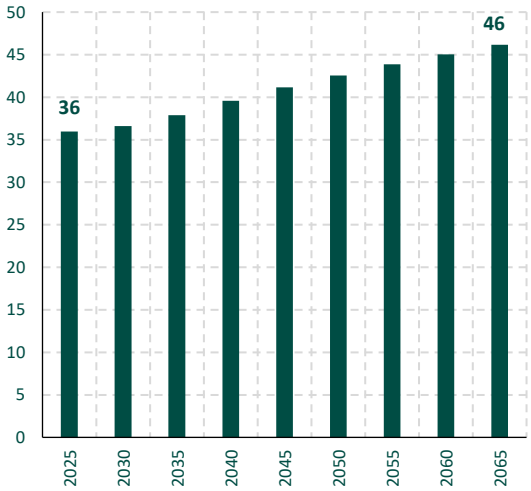
Figure 12: Changing demographics and fiscal costs

a: Age composition 2022-2065, per cent of population



Source: Future Forty

b: Age-related expenditure, % of total voted expenditure



Source: Future Forty

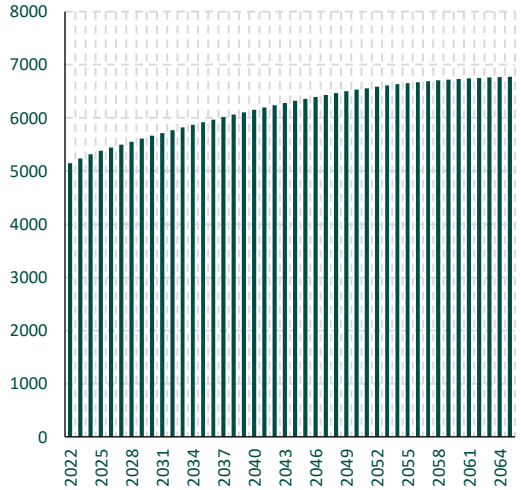
3.3 Demographic Change – Who can we learn from?

While population growth is expected to moderate over the next few decades, total population in Ireland is still expected to grow, reaching around 6.8 million people by 2065 (**figure 13a**).

This is at odds with trends in many other countries, many of whom are already grappling with the realities of a declining population. Between now and 2050, countries including Japan, Korea, Greece, Latvia, Lithuania, Italy and Poland are projected to decline on average by nearly 16 per cent (**figure 13b**).

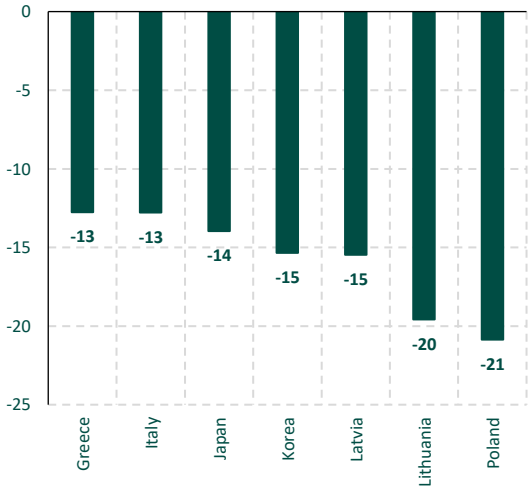
Figure 13: Population peak and decline

a: Population in Ireland, million



Source: Future Forty

b: Population decline in select countries 23-50, per cent



Source: UN World Population Prospects 2024

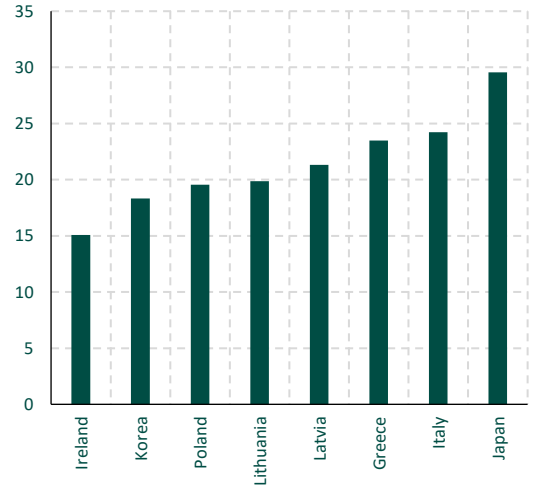
These nations have also seen a marked increase in their elderly population. For example, in Japan in 2023, the population aged 65 and over represented almost 30 per cent of the population, nearly twice the level in Ireland. (**figure 14a**). However, by 2050, the percentage of the population aged 65 and over

in Ireland will be similar to current levels in Japan today (27 per cent).

Even in aged societies, the 'greying' of the population is set to further accelerate. For example, in Japan, the population aged 74 and under is set to decrease between now and 2050. In contrast, the population aged 75 and over is set to grow by almost 20 per cent between now and 2050 (**figure 14b**).

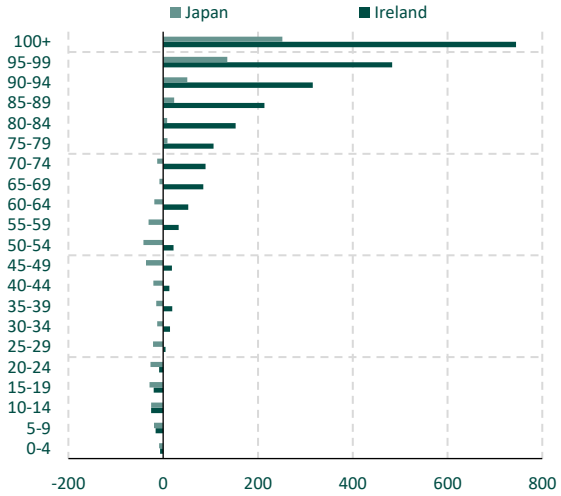
Figure 14: Growth in the elderly population

a: Population aged 65+ in 2023, per cent



Source: UN World Population Prospects 2024 and Future Forty projections for Ireland

b: Change in population: 2023-2050, per cent



Source: UN World Population Prospects 2024 and Future Forty Projections for Ireland

3.4 What age-related policies have ageing countries pursued?

An ageing population impacts on, *inter alia*, economic growth, labour markets, consumption, and the public finances. The first wave of countries experiencing population ageing have already begun to feel these economic consequences. The policies employed by these countries will be important considerations for Ireland as our population continues to age. Such policies include pro-natalist interventions, increasing labour force participation and reforms to reduce healthcare costs.

Pro-natalist policies

In response to declining fertility rates (**figure 15a**), a number of countries have introduced pro-natalist policies. The Japanese government has introduced several measures over the years to make having children an easier and more attractive option, including the Angel Plan in 1994 and the New Angel Plan in 1999. In 2009, the Japanese government introduced the Plus One Policy which aimed to create parent-friendly working conditions, with funds allocated for the construction of 50,000 new daycare facilities.[23]

Other countries have also pursued pro-natalist measures; spending on these policies in the EU has risen by over 50 per cent between 2000 and 2021 (in constant price terms).[24] Prominent examples of large-scale efforts to increase fertility rates in the EU are the 500+ program in Poland and the CSOK policy in Hungary.[25]

[23] For more information, see *Tackling the Declining Birth Rate in Japan,* Centre for Public Impact (April 2017). Available at: https://centreforpublicimpact.org/public-impact-fundamentals/tackling-the-declining-birth-rate-in-japan/
[24] Expenditure on family and child benefits. For more information see, Social protection statistics – family and children benefits, European Union (May 2024). Available at: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Social_protection_statistics_-_family_and_children_benefits
[25] For more information, see *Pro-Natal Policies Work, But They Come With A Hefty Price Tag*, Institute for Family Studies (March 2020). Available at:

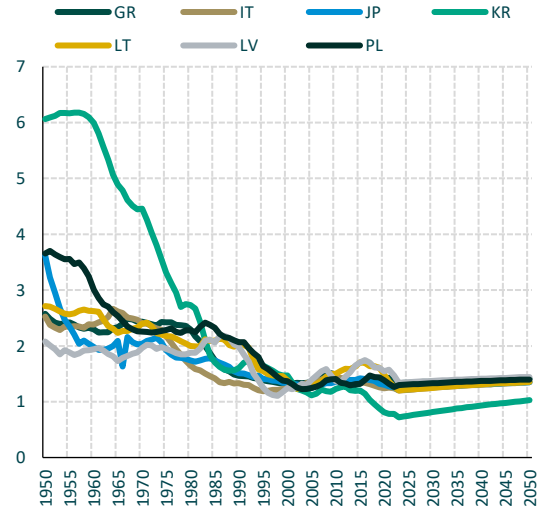
Launched in 2016, the 500+ programme in Poland provides direct cash payments to parents who have two or more children. The programme had total annual expenditures of around PLN 20 billion (c. €470 million).[26] The CSOK policy in Hungary was launched in 2015 and offers up to 20 million HUF (nearly €65,000) of assistance per family with three or more children to buy newly built homes.

Analysing the rolling change in crude birth rates over the 12 months from when each country launched its pro-natal policies offers insight into their impact. Hungary's program nudged births up slightly, while Poland's birth rate rose dramatically after its 500+ program was implemented. This may be because Poland's policy is very generous, offering nearly universal cash benefit for many families, whereas Hungary's pro-natalist policy was more limited, offering targeted loans and other financial incentives.[27]

Despite this, the effects of both policies were short-lived. In 2018, the fertility rate in Poland fell from 1.6 to 1.5 and in Hungary in 2017 the number of children born decreased below 2015 levels (**figure 15b**). This suggests that on their own, financial supports only have small or transitory effects on fertility rates.[28]

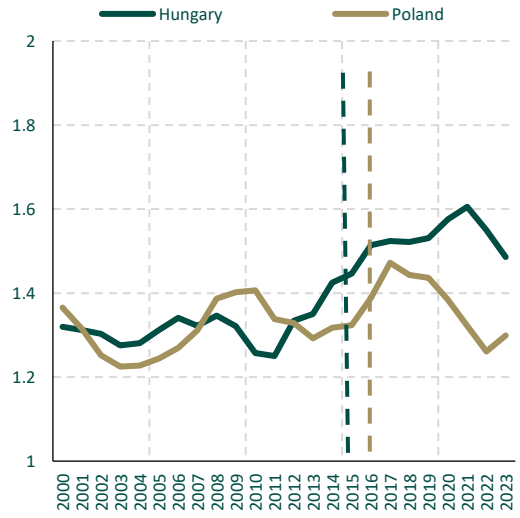
Figure 15: Declining fertility rates

a: Fertility rate in select countries, per cent



Source: UN World Population Prospects 2024

b: Fertility rate, per cent



Note: Gold and green dotted line represent the introduction of Poland's and Hungary's pro-natalist policy, respectively.
Source: UN World Population Prospects 2024

Given these trends, it is likely that a more multifaceted policy approach is required to increase fertility rates. Results from an OECD-wide regression on the impact of public policies on fertility rates found that public spending on parental leave, early childhood care programmes, paid leave available to mothers, financial support for households with children and general housing costs influenced fertility rates.[29] While these results are based on a small sample, they give some indication of the broad suite of policies available to influence fertility decisions in developed countries.

https://ifstudies.org/blog/pro-natal-policies-work-but-they-come-with-a-hefty-price-tag

[26] Evolution of the Family 500+ Programme: National and International Perspectives, Maria Currie Sklodowska University (2021).

[27] It should be noted that Poland's 500+ program was also implemented in parallel with other programmes that could contribute to an improvement in fertility. This makes it difficult to disentangle the effect of the 500+ program on fertility rates.

[28] Indeed, there may be a deadweight risk associated with pro-natalism policies, specifically where it induces people who would have had children anyway to have children earlier in life. Therefore, while the fertility rate rises in the initial years of the program, the cohort's fertility rate rises only marginally overtime.

[29] See, *Society at a Glance: Asia/Pacific 2025: A Spotlight on Fertility Trends*, OECD (February 2025). Available at: https://www.oecd.org/en/publications/society-at-a-glance-asia-pacific-2025_24fa8f05-en.html

However, even Nordic societies who have been at the frontier of promoting such programmes including generous parental leave, childcare and cash benefits have experienced declining birth rates with a rising average age for first-time parents. This suggests that there are likely deeper societal and cultural shifts at play leading people to delay parenthood or desire fewer children, even in the presence of generous support.

Increasing labour force participation

Most directly, an ageing population weighs on economic growth through a decline in the working-age population.[30] Across OECD countries, for every 100 workers there are 44 people aged 50 and over who are not in the labour force.[31] By 2050, this is expected to rise to 56. In countries such as Italy, Poland and Greece, there could be on average up to 90 retired people for every 100 workers.

To maintain living standards, efforts should be taken to retain workers towards the end of their career, including by removing disincentives to work at older ages and through initiatives to support life-long learning. One way to encourage greater workforce participation for older persons is pension reform.[32] Beginning in 1992, Italy has gradually raised the age of retirement in the private sector.[33] In 2010, the old-age pension was tied to life expectancy and in 2019 the age requirement for old-age pensions was raised again. By 2019, the standard age for receiving an old-age pension was 67 in Italy.

Consequently, employment rates among old age groups in Italy increased, with the employment rate for men aged 55 to 65 increasing by almost 25 per cent over the last 20 years, narrowing the gap with respect to other euro area countries (**figure 16a**). For women, the increase was even larger – 30 per cent, although the gap between euro area countries and Italy remained broadly stable (**figure 16b**).

In 2014, Ireland increased the state pension age from 65 to 66. Recent analysis from the ESRI found that the reform had no impact on labour force participation or hours worked. Instead, there was a significant substitution into alternative welfare programs.[34] However, this analysis was only performed for the years immediately following the increase in state pension age and it was not possible to estimate a longer-run effect. This highlights the need for further work to be carried out to examine the impact of pension reform on labour market outcomes in Ireland.

[30] See, *Population Ageing and the Public Finances in Ireland: Changing Demographics*, Department of Finance (June 2024). Available at: https://www.gov.ie/en/publication/dc825-population-ageing-and-the-public-finances-in-ireland-changing-demographics-and-population-ageing/

[31] Either because they are inactive, in the labour market or in retirement.

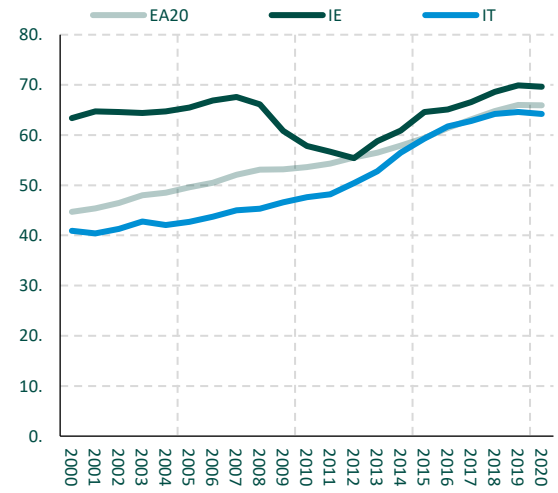
[32] In contrast, Ireland repealed previously legislated plans to increase the State Pension Age in 2020.

[33] Franco, D., Tommasino, P (2020), Lessons from Italy: A Good Pension System Needs an Effective Broader Social Policy Framework, *Intereconomics,* Volume 55, No.2, pp.73-81

[34] Tuda, D., Doorley, K., and Sándorová, S. (2026). The unintended consequences of a pension age increase. Evidence from Ireland, ESRI Working Paper 816, Dublin: ESRI, https://www.esri.ie/publications/the-unintended-consequences-of-a-pension-age-increase-evidence-from-ireland

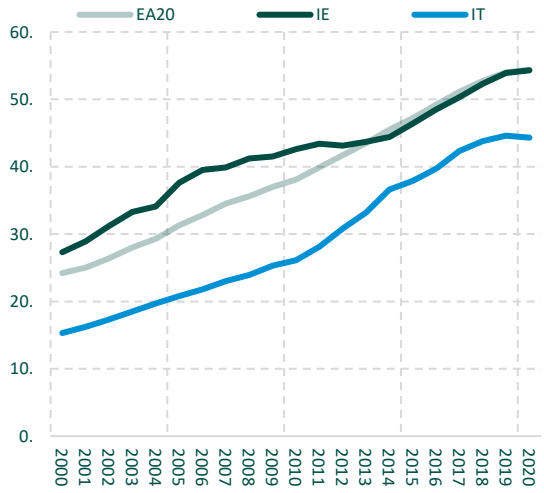
Figure 16: Employment rates among older cohorts

a: Male employment rate 55-64, per cent



Source: Eurostat

b: Female employment rate 55,64, per cent



Source: Eurostat

Reforms to reduce healthcare costs

Alongside pension reform, a broader set of policies will be required to meet the healthcare needs of an ageing population. Over the past twenty years, spending on healthcare across OECD countries has increased, on average, rising from around 7 per cent of GDP in 2000 to almost 9 per cent by 2019.[35] This has been driven *inter alia*, by rising incomes, technological innovation and an ageing population. In the absence of major policy changes the OECD projects that healthcare spending will grow at an average annual rate of 2.6 per cent between 2019 and 2040 across OECD countries.

To address rising healthcare expenditure requirements, several countries have adopted reforms to improve the cost of care delivery and reduce expenditure pressures. For example, in response to rising costs and challenges in financing universal long-term health care, Japan has pursued technological improvements that automate aspects of elderly care. Japan has been at the forefront in the development of technologies such as 'care robots' to improve the quality of care in nursing homes while reducing labour requirements. Similarly, Singapore has also invested in technological healthcare solutions for its ageing population, such as improving wearable wellness technology and smart home solutions such as fall detect sensors to facilitate independent living and ease pressure on healthcare systems.[36] [37]

Ireland's healthcare system is also undergoing substantial reform in response to an ageing population and rising healthcare demands. "Sláintecare" [38] aims to move the health system from a model centred around expensive acute care, to one focussed on the delivery of primary and community healthcare at a local level. The Enhanced Community Care programme is one such policy pursued under these reforms, with this providing community and primary care services at a local level so as to reduce avoidable and unnecessary admissions to hospitals. Public health measures, including disease

[35] OECD (2024), Fiscal Sustainability of Health Systems: How to Finance More Resilient Health Systems When Money Is Tight? OECD (January 2024). Available at: https://www.oecd.org/en/publications/fiscal-sustainability-of-health-systems_880f3195-en/full-report/component-3.html#execsumm-d1e111-9032e5da69

[36] Jones CH, Dolsten M. Healthcare on the brink: navigating the challenges of an aging society in the United States. *NPJ Aging*. 2024 Apr 6;10(1):22. doi: 10.1038/s41514-024-00148-2.

[37] Some evidence suggests that 'care robots' haven't significantly reduced the labour intensity of caring work but has rather reduced the intensity of healthcare workers by automating many of the more physical or tedious tasks, thus helping working conditions and staff turnover. While this is an important development, the impact of care robots on the health sector will depend on future developments in robotic capability.

[38] Committee on the Future of Healthcare – Sláintecare Report, House of the Oireachtas, May 2017. Available at: https://www.gov.ie/en/department-of-health/publications/sl%c3%a1intecare-publications/#slaintecare-report

prevention, vaccination and healthy ageing can also play a role in reducing healthcare demand and expenditure pressures.

Ireland has already seen a substantial rise in total healthcare spending, rising in real terms by 60 per cent over the last decade. Known demand pressures, including an ageing population, will further weigh on expenditure in this area in the future, constraining future budgetary decisions. In many other countries, this is already the case with healthcare spending taking up a large share of available government resources.

3.5 Conclusion

As population ageing accelerates, there is a crucial window of opportunity for reform. Countries, including Ireland have only a few years to intensity efforts before demographic effects take hold.

Valuable lessons can be learned by examining the policies of other countries that are already addressing the challenge of demographic change and population ageing. As demonstrated, this approach can offer insights into how to best adapt our pension, healthcare systems and the labour market to accommodate changing demographics. Given the enormous demographic shifts that Ireland will experience over the next two decades or so, it will be vitally important that these lessons are learned.

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