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NATIONAL ACCOUNTS FOR A GLOBAL ECONOMY: THE CASE OF IRELAND[1]

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ABSTRACT

Globalisation is affecting the way economic activity is reflected in the National Accounts. Intellectual property, which is now part of the capital stock, interacts with the choice of global firms as to their legal structure, producing different national accounting outcomes for individual countries. This is but one manifestation of the challenges that a global economy presents for national accounting. Using the example of Ireland, consideration is given to the data needed to meet the needs of users of National Accounts. In particular, more information is required to separately identify all the activity of multinational enterprises and domestically owned firms. This paper suggests a set of satellite accounts for Ireland that would show how changes in the economy affect the economic welfare of Irish residents.

1. INTRODUCTION

This paper considers some of the problems for users of the current system of National Accounts due to the globalisation process. The inclusion of intellectual capital in the capital stock in the latest System of National Accounts (SNA 2008) further complicates a situation that was already difficult. While this note concentrates on the problems using data for Ireland, many of the same problems affect users of National Accounts for other economies, albeit to a lesser extent (Avdjiev et al., 2018; Wright and Zucman, 2018).

The National Accounts were originally developed for a pre-Second World War economy where goods and services were produced within individual countries without substantial inputs from abroad. The modern world, where goods and services for final demand are produced in stages across a range of countries involving a complicated supply chain, poses special problems for National Accounts.

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The growth in the importance of intellectual property (IP) as a key input in the production of some goods and services has further complicated things. These problems are aggravated by the operation of US tax law.

The importance of foreign Multinational Enterprises (MNEs) in the Irish economy, especially US owned MNEs, and their concentration in certain key sectors where IP is crucial, means that the Irish National Accounts face special problems of interpretation.

In the case of Ireland, the problems with the National Accounts have manifested themselves in a particularly remarkable way, giving rise to a growth in real GDP in 2015 of over 25 per cent that was clearly 'incredible'. The fact that it was incredible reflects a problem with the underlying accounting framework, not with a failure to apply the accounting standards.

National Accounts were developed to meet a range of needs of policymakers in managing a modern economy. For example, national accounting data are required by those responsible for fiscal policy to understand what is happening on the domestic labour market and also the level of utilisation of physical capital located in Ireland. They also need to know how much of the output in Ireland represents a benefit to Irish residents.

While many countries have standardised on SNA 2008 (ESA 2010), the failure to implement it globally gives rise to a mismeasurement of global GDP: the movement of major economic activity to Ireland in 2015, as measured by SNA 2008, does not appear to have been counterbalanced by a corresponding fall elsewhere. This lack of consistency poses problems for international comparisons outside the EU.

There are also special problems in interpreting the current account of the Balance of Payments as a result of the unfolding of the globalisation process. The current account of the Balance of Payments is a key indicator of the sustainability of the current level of economic activity in an economy, but the standard treatment under SNA 2008 renders it totally ineffective as an indicator for a country such as Ireland.

In seeking to find a solution to the Irish problems the best approach would be to modify the ESA/SNA to ensure that it provided appropriate data for policymakers in all jurisdictions. However, this is clearly not going to happen in the foreseeable future. Instead Ireland and other countries affected in a similar manner will have to persevere in producing an appropriate framework of satellite accounts that provides a sensible depiction of what is happening in the domestic economy. While most external users will continue to use GDP for international comparisons, an alternative domestic framework providing more appropriate indicators of domestic economic activity, could, if suitably explained, be used by those interested in economic policy in Ireland, and also by those abroad interested in the Irish economy. However, it would be beneficial if a similar supplementary framework of accounts was adopted by other countries, particularly those affected by the problems discussed in this paper.

Where problems will arise will be with EU aggregates, such as Euro Area GDP, which is affected by the discontinuities in the accounts for Ireland. In 2015 the exceptional growth in Irish GDP added 0.5 percentage points to the Euro Area growth rate. International agencies such as the ECB, DG Ecfin, the IMF, etc., will need to adjust for such discontinuities.

Section 2 of this paper discusses the needs of users of National Accounts. The failure of the current system of accounts to meet these needs underpins the discussion in the rest of the paper.

Section 3 considers how we model output in a global world. The complexity of modern supply chains poses special problems in developing National Accounts for very open economies. The evolving model of world production requires a development in the way the National Accounts measures an economy. In particular, a new set of satellite accounts needs to handle the returns on IP capital, which can be located anywhere in the world, in an appropriate manner. It also needs to focus on the utilisation of labour and physical capital located in a country.

Section 4 describes the National Accounting significance of the legal structures used by MNEs in operating in different economies. Any new system of satellite accounts needs to be robust to changes in the legal structure of large companies or changes in tax law.

Section 5 sets out the problems posed for the Irish National Accounts as a result of globalisation and Section 6 outlines some possible solutions to the problems identified in this paper. Conclusions are reached in Section 7.

2. WHAT IS THE PURPOSE OF COLLECTING NATIONAL ACCOUNTS?

The National Accounts are designed to present a picture of an economy that can be useful to those managing that economy or working in that economy. The way the accounts are defined and presented should take account of the needs of users and the purpose for which they will be used.

2.1 Fiscal and monetary policy

Since the national accounting framework was first developed, the National Accounts, in particular the key aggregates, have been an essential tool for those responsible for fiscal and monetary policy. In the case of fiscal and monetary policy it is very important to understand the state of the economic cycle using national accounting data.

In addition, in preparing a Budget, governments need to understand, not just the overall level of output, but also what is happening on a range of other important national accounting aggregates. This is essential in assessing tax revenue for the coming year, and also in understanding the pressures on expenditure.

Both for fiscal and monetary policy it is, therefore, necessary to have at least one or two key aggregates that represent the level of real activity in the domestic economy – the economy for which the policymakers are responsible.

Fiscal rules, such as the Stability and Growth Pact and its successor depend on GDP being a meaningful indicator of domestic activity. For countries such as Ireland, an alternative set of measures is needed on which to base fiscal rules.

In managing monetary policy the behaviour of Central Banks is often characterised using a Taylor rule. Under such a rule monetary policy is tightened as actual output rises above potential output. However, such a rule depends on the availability of reliable measures of domestic output.

To support policymakers, national accounting aggregates must be consistent over time**.** Discontinuities, for whatever reason, make it impossible to determine the

growth rate at the point of discontinuity. In addition, to understand the behaviour of the economy and to calibrate policy interventions correctly it is essential to have consistent time series for the National Accounts that can be used for research and related modelling.

A second requirement for the National Accounts aggregates is that they reflect the level of physical activity in the economy being regulated by the fiscal or monetary policy authorities. The data must show developments in the domestic labour market and the domestic market for physical capital. The data could well prove misleading if they cover physical activity that takes place in other economies. SNA 2008/ESA 2010 does not ensure that the output covered by the key aggregates, such as GDP, is appropriately aligned with the jurisdiction of individual fiscal or monetary policy authorities.

The proposed approach would mean that the real activity of subsidiaries of domestic multinationals should be included in the output of the economies where the subsidiaries employ labour and physical capital. In turn, domestic activity for Ireland should include the real activity of subsidiaries of foreign owned multinationals that takes place in Ireland.

2.2 Broader economic policies

A second major role for the National Accounts is to provide appropriate information to governments on how an economy is behaving, where growth is coming from, where output is being sold etc. This information is needed to support governments in developing policy across a wide range of different fields.

Policymakers are primarily concerned with output and activity physically located in the country over which they have jurisdiction. For example, if a significant part of the output attributed to Ireland is produced in Asia with Asian labour and Asian physical capital, this will be of little concern to domestic policymakers. It is only in so far as the activities of such businesses directly affect those who are living in the country for which the accounts are prepared, that the accounts will be useful.

As discussed later, the accounts for Ireland, prepared under SNA 2008/ESA 2010, do not meet either of these two requirements. In Ireland the problem arises in trying to identify what part of the activity being measured in the accounts directly benefits those living in Ireland.

The current account of the Balance of Payments was one of the key indicators showing that the growth in activity in Ireland (and a number of other EU economies) was unsustainable in the last decade. However, because of the effects of globalisation on the accounts today, the current account of the Balance of Payments no longer signals the gap between savings and investment of Irish agents. It is clear that such an indicator is essential for the safe management of a modern economy.

2.3 Informing citizens and companies in the economy about what is happening

The considerations here are very similar to those for policymakers. Citizens and companies need information on what is happening in an economy in so far as it will affect them. In an economy with large foreign MNE activity this means that the attention should be more focussed on GNI and Net National Income (NNI) rather than on GDP.

For this broader audience it is even more important that the development of the economy, as manifested in the accounts, is clearly explained. There will also be a need to concentrate on one or two key aggregates when communicating with a very wide audience.

2.4 Tax base

The National Accounts data, in particular GNI, are used as a tax base in calculating Budgetary Contributions to the EU. For this purpose they should include activity that benefits those living in a country, even if much of the related activity does not take place in that country. Because Ireland benefits from the corporation tax paid by foreign MNEs operating in Ireland, it is appropriate that their profits, on which Irish corporation tax is paid, should be included in the base for EU taxation.

2.5 International comparability

A further very important use of National Accounts data is to provide international comparisons between economies. For this purpose it is essential that the data are prepared on the same accounting basis across countries. Currently all EU countries use SNA 2008/ESA 2010, which facilitates comparisons within the EU. However, because countries are affected in different ways by the process of globalisation, if there are anomalies in how the accounting standards treat certain items, it may affect the usefulness of the data for comparative purposes.

Where the inadequacies of SNA 2008 require the development of satellite accounts, as discussed in this paper, it would be better that they were done on a consistent basis across countries. If each country develops its own system of satellite accounts, policymaking at an EU level would be less transparent. To the extent that SNA 2008 is not fully implemented in some non-EU countries this makes international comparisons with non-EU countries more difficult.

3. MODELLING OUTPUT

When National Accounts were first developed in the 1930s it was not unreasonable to consider the world as being made up of a series of national economies which undertook limited trade in final goods. However, since the Second World War, major changes in the world economy, especially the freeing of trade, have changed this situation so that for some purposes national economies, in the sense of the 1930s, have been transformed into subsectors of a global economy.

It can be useful to consider these and other changes within an encompassing model of world production. In this model the choice of the location for production by a stylised world firm (or myriad of firms) is made so as to minimise the world firm's cost of production. In the 1930s each firm chose capital, labour and materials in each separate national economy to minimise the cost of production of national output. Domestic production was primarily directed at satisfying domestic demand.

However, with the freeing of trade, the world firm(s) can choose to locate some of the production process of a good (or service) in one country and then combine the components produced in one country with labour and capital in another location to produce a final good. In this case the production of the final good in a country will be undertaken using domestic capital and labour, combined with materials for further production that are produced in another location. Where final products consist of components from many countries, the cost of production in an individual country can influence domestic value added (GDP) in two ways:

- First the relative cost of production in one country compared to the rest of the world will affect the location where the final good will be produced, hence affecting domestic value added (GDP).
- Secondly, changes in relative factor prices within a country can also affect domestic value added by causing the world firm to produce more or less of that final good in the relevant country by varying the share of material inputs,

many of which may be imported – the substitution effect of changes in relative prices.

This model encompasses behaviour such as outsourcing, modelling it as a function of the changes in the cost of domestic inputs relative to the cost of materials produced abroad. As a result, as discussed below, the effect of changes in the relative cost of domestic inputs on domestic value added must include both the substitution of gross output in a particular economy for similar output elsewhere, and also the substitution of domestic inputs (labour and capital) by material inputs, which are generally imported.

$$C_w = f(c_I, c_R, t) \tag{1}$$

The approach taken in the traditional National Accounts of the 1930s assumed a model where the production of goods on a worldwide scale can be characterised by a cost function (1) where the cost of world output, *Cw*, is a function of the unit cost of production in an individual country c_I relative to the rest of the world, c_R, and technical progress, *t*.[2] Then the share of world output Q_W that is located in the individual country *i*, Q_I, (2) is a function of the unit cost of production in country *i*, c_I, relative to the unit cost of production in the rest of the world, c_R, and technical progress, *t*.

$$\frac{Q_I}{Q_W} = f(\frac{c_I}{c_R}, t) \tag{2}$$

$$c_i = \frac{C_i}{Q_i} = f(p_l, p_k, p_m, t) \tag{3}$$

The unit cost of production in country *i* is defined in Equation (3) as a function of the price of labour, p_l, the cost of capital, p_k, the price of inputs of goods and services, p_m, and technical progress, *t*. From this equation the share of each of the factors of production – labour, capital and materials – in domestic output can be determined.

For this model to be a valid representation of the economy of country *i*, a number of assumptions are necessary, including the assumption of constant returns to scale.

For a national output aggregate to be valid for any country it must be weakly homothetically separable from output in all other countries (Denny and Fuss,

[2] The exposition here is based on Bradley and FitzGerald, 1988.

1977; Pindyck, 1979). This allows a two-stage optimisation procedure where firms in individual countries choose the optimal mix of inputs to use to produce national output. Then the share of world output to be produced in country *i* is a function of the unit cost of production in country *i* relative to the unit cost of production in all other countries.

The assumption of weak homothetic separability means that changes in relative prices of factors of production within one country, which do not affect the overall cost of production in that country, will not affect the mix of inputs used to produce a good in another country. In other words, in producing a good or service it is not possible to freely mix factor inputs from different countries in different proportions to produce a final good or service. This is a world where the supply chain does not spread across different countries but inputs are sourced nationally. While this restriction may have seemed realistic in the 1930s, in a modern world the restrictions are no longer valid.

The freeing of trade in the post-war world saw trade expanding rapidly, not just in final goods and services, but also in inputs used in the production process. This has gradually resulted in the complex supply chains which underpin modern production. This development gives rise to many of the problems with the National Accounts for countries such as Ireland, which are small but fully integrated into the global supply chain.

Because of the ability to shift production between countries, the effects of reaching full employment or full utilisation of fixed capital in a particular economy can be rather different from that in a closed economy world. Instead of factor prices rising rapidly in the face of high levels of capacity utilisation, it is possible to shift some of the production process elsewhere. This has implications for fiscal and monetary policy.

A second assumption of the standard production model is that capital is located in a particular country and used for production in that country. It also assumes that the marginal product of capital (and of other factors) is diminishing. However, intellectual property, which is now, appropriately, included as an element of the capital stock, has rather different characteristics. It may be technically located in one country (and receive its returns in that country), while it may be used to produce output world-wide. As Haskel and Westlake, 2017, emphasise, intellectual property (IP) is highly scalable: the same ‘quantity’ of IP can be used to produce a million or a billion smartphones. As a result, this type of capital does not fit easily into the traditional model of production or into the

traditional National Accounts framework; the marginal product of IP is not diminishing. Also it can be used across many different countries.

$$C = f(K_p, p_{il}, p_{ik}, p_{jl}p_{jk} \dots \dots p_r, t) \quad (4)$$

Today the choice facing the world firm(s) may be better represented by Equation 4 which relaxes the assumption of weak homothetic separability between factors in individual countries. Instead the world firm(s) can choose to mix the factors from different countries *i*, *j*, etc. in a complicated supply chain. Raw materials p_r are located independently of where the production takes place. Also, in the modern world the stock of IP, K_p is increasingly separable from all other factors of production. It can be located anywhere in the world.

The returns on IP are separable from the returns to the other factors. This means that the inclusion of the returns to IP in a particular economy may not reflect the returns to that factor as used in that economy. National output, as understood when the National Accounts were first developed, no longer exists as a separable aggregate. The attribution to Ireland of the returns to IP owned by foreign MNEs in Ireland is very seriously distorting the traditional measure of national output. That is because the returns to IP arise from the use of the IP to produce goods in Asia, not Ireland.

However, while such a model better represents a global world, it has been necessary to impose significant restrictions to make it tractable for economic analysis. Nonetheless it is important that the data provided by the National Accounts reflect the complex decision-making process which determines the global location of output and the utilisation of factors in individual countries.

The theoretical model has important implications for the users of National Accounts and for the information they need to obtain from the accounts.

Instead of concentrating on national output (GDP) which includes the returns to IP capital, fiscal and monetary authorities need to focus on the utilisation of 'domestic' factors of production, physical capital[3] and labour, located in an individual economy. Focusing on the utilisation of domestic factors of production also deals with the problem that in a modern economy, with complicated supply

[3] This includes the physical capital owned by foreign MNEs that is located in a particular economy.

chains, domestic factors of production are not weakly separable from factors of production in other countries.

This suggests that a lot more information is required on the income and output side of the accounts to understand what is happening to the utilisation of 'domestic' factors of production and where growth in an economy is actually arising. The returns to labour and physical capital, wages, and profits before and after depreciation, need to be separately identified for each sector. Separately identifying the returns to IP capital will not be feasible. Instead, companies where the returns to IP capital dominate profits from using physical capital (foreign MNEs in the Irish context) will need to be separately identified. Finally, because policymakers are also interested in the income available to domestic residents, the contribution of firms to Net National Income (NNI) needs to be identified by sector.

4. LEGAL DISTINCTIONS MATTER

Two legal issues have a significant effect on how the operations of MNEs are reflected in National Accounts. The first concerns the legal form used by an MNE operating in a country other than its home location. The second is how the company is affected by tax law, in particular how US companies are affected by US tax law.

4.1 Legal structure

For over a century many companies have moved from operating on a purely national scale to operating in two or more different countries. This 'globalisation' can occur in different ways. Initially a company may buy services or inputs from firms in other countries. A second stage may involve the establishment of a subsidiary in one or more foreign countries making the company a Multinational Enterprise (MNE). A third approach, which has become more popular in recent decades, is to contract with foreign firms to manufacture goods on behalf of the MNE in factories owned by independent companies in foreign locations.

Where firms buy goods or services abroad this appears in the National Accounts as imports and exports in a straightforward manner. The output in the foreign location is included in that country's GDP.

Before the freeing of trade the establishment of a foreign subsidiary was often the only way to move into a new market, bypassing tariff barriers. It allowed

companies to exploit their intellectual property on a wider scale in the face of major restrictions on trade.

Today, for many MNEs, this approach remains a vital stage in establishing an integrated supply chain. Whereas initially the production process may have been replicated in different locations to avoid tariffs, today the different stages in the supply chain may be undertaken by subsidiaries located in different countries around the world to minimise the world cost of production.

In setting up a subsidiary in a country, an MNE establishes a legal presence there. The physical capital and labour used by the subsidiary is clearly part of the stock of physical capital and labour in the country where the subsidiary is located. As a result, the activity of the subsidiary is recorded as part of the activity in the country where it is located: the GVA, physical investment, employment, the wage bill, profits and depreciation are all included in the detailed National Accounts for the country where the subsidiary resides.

The relationship of a subsidiary in another country with the parent MNE, wherever it is located, is reflected in a transfer of the after-tax profits earned by the subsidiary to the parent, a flow of factor income which represents a wedge between GDP and GNI. Even if temporarily retained in the origin country, this payment is treated as being accrued to the MNE parent in the period in which it is earned. There may also be other intra-company transfers which affect the National Accounts. For example, royalties may be paid for use of the parent company's IP. Also parts or services may pass from one subsidiary to another, appearing as exports and imports.

A third approach to operating on a global scale involves an MNE contracting with a company in another country to have goods or services produced for it. In this case the MNE provides the IP but the local company owns the capital and employs local labour. Because the work is done on contract for the MNE, the goods or services produced by the local company are owned by the MNE from the initiation of the production process.[4] The goods (or services) are recorded as an export from the country where the MNE that owns the goods resides, not

[4] For example, while small relative to the total output of the Irish pharmaceutical sector, there has been contract manufacturing work done in Ireland for foreign pharmaceutical companies. In this case the drug is shipped in powder form to an Irish company to be pressed into tablet form. The powdered drug is, at all times, owned by the foreign company contracting with the Irish company so that it is not considered as being produced in Ireland. Rather, for national accounting purposes, only the payment to the Irish company for the services is included in exports. Meanwhile, the gross flows of the drug are included in the trade statistics.

from the country where they were manufactured. Also imported inputs used in the process are recorded as imports in the country where the MNE that owns the goods resides. The operating surplus, over and above the payments to the local producer, is recorded as output in the country where the MNE that owns the IP is located.[5]

Thus there is a very different national accounting treatment for goods or services physically produced in a country depending on the legal arrangements between the MNE and the local company.

The decision by MNEs to go the contract manufacturing route may be due to uncertainty about how well a subsidiary company may be treated in the host country's legal system or by its administration.[6] Local entrepreneurs may be favoured in many ways. Also the MNE may be concerned that, if IP is transferred to a subsidiary, it might not be protected by the host country legal system.

For whatever reason, contract manufacturing tends to be used by IT companies with large IP having goods manufactured in countries such as China. The subsidiary route is favoured in cross border activities by MNEs, such as German or Japanese MNEs producing cars and other goods, in particular where the subsidiaries are located in OECD countries.

The fact that the distinction between manufacture by a subsidiary and manufacture on contract makes a big difference to the national accounting treatment of MNE activity leaves open the possibility of future big discontinuities in the National Accounts for individual countries. If the legal framework changed to make establishing a subsidiary preferable in certain major Asian economies, such as China, the MNEs currently operating contract arrangements could suddenly change their legal form. This could result in a large amount of what is treated as output in Ireland, or elsewhere, suddenly being included in the National Accounts for the Asian country where the physical manufacturing takes place. The relocation of output in the accounts would be replaced by a transfer to the MNE, wherever it is headquartered, of after-tax profits as part of factor income. Similarly, a shift of production from China to a country, such as India, where establishment of subsidiaries is preferred, could also see a major change in output in the country where the MNE's head office is located, such as Ireland.

[5] Thus the operating surplus on manufacturing "Donald Trump" ties in China in 2015 would have been treated as US GDP, in spite of the fact that they were manufactured in China on contract.

[6] For example, foreigners may be subject to arbitrary charges.

While these cases would give rise to significant discontinuities in GDP, they should not affect NNI (Net National Income).[7]

While the current approach to recording activity in SNA 2008, if applied across the world, will consistently record world GDP, it poses many problems for the key users of the data. It means that GDP and also, as is outlined later, GNI may not provide a good guide for policymakers. In addition, if the SNA is not correctly applied in all countries by their national accounting authorities, world GDP and GNI may be incorrect and subject to discontinuities as MNEs change their legal structure.

As was discussed in the previous section, what is needed is a set of satellite accounts identifying the returns to domestic factors of production, distinguishing between foreign MNEs and the rest of the economy. Unlike the current situation with GDP and GNI, NNI arising by sector, derived in this way, will be unaffected by changes in MNEs' legal structures in third country locations.

4.2 Tax law

A number of the problems with the Irish National Accounts arise from how US tax law affects the behaviour of US MNEs. The problems are much less in dealing with MNEs originating in other countries such as Germany, France, or the UK. The key difference is that, until now, US tax law meant that all profits of US firms, wherever earned, were taxable eventually in the US. However, until now, US firms were allowed to defer repatriating profits and so 'temporarily' avoid paying the US tax liability. This has proved especially important for firms with large IP, such as firms in the IT sector.

The changes in US tax law in 2017 are significant and may lead to further movement, especially changes in the country in which firms locate their IP. The requirement that the US owners of IP held abroad pay a minimum tax rate of 10 per cent could see further major relocation of such IP, possibly to Ireland. However, we do not consider how the recent US changes in tax law may affect the National Accounts in the future in any detail.

[7] As discussed later, the treatment of depreciation of IP of MNEs can seriously distort GNI.

TABLE 1 SHARE OF GROSS OPERATING SURPLUS IN GVA, BY COUNTRY OF OWNERSHIP, %

	2008	2009	2010	2011	2012	2013	2014	2015
Germany	34.4	31.8	41.6	40.5	53.4	NA	59.2	36.3
France	53.3	42.0	56.0	71.5	47.1	NA	60.3	58.7
UK	38.1	34.1	32.9	46.6	43.4	NA	49.3	38.2
US	79.8	80.1	81.1	82.6	82.8	NA	85.6	94.4
Japan	62.8	69.3	62.6	74.5	70.9	NA	82.7	84.0
Other foreign	58.3	54.9	62.2	63.3	66.6	NA	54.5	80.2
Ireland	28.1	31.2	32.6	35.4	35.4	NA	37.9	44.7

Source: Eurostat Structural Business Statistics.

Since 1956, Ireland has operated a low rate of corporation tax which was gradually extended to cover all activity undertaken in Ireland.[8] This has made it attractive for some MNEs to adjust their global structure so that a larger share of their global profits is earned in Ireland and subject to Irish corporation tax (Conroy, et al., 1998). Such a transfer of profits is reflected in the gross operating surplus of firms so that it represents a high share of their value added in Ireland.

Table 1 shows the Gross Operating Surplus (GOS) of subsidiaries of foreign MNEs operating in Ireland as a share of Gross Value Added (GVA), and a comparable figure for Irish firms. The shares for German, UK and Irish firms are rather similar. The share for French subsidiaries in Ireland is a bit higher. However, the profit share for US firms is exceptionally high, and also very high for other non-EU firms, including Japanese firms. After the relocation to Ireland of IP by US owned MNEs in 2015, the profit share for such firms approached 95 per cent of value added.

These data suggest that for MNEs owned in the EU, domestic tax law in the country where the MNEs are resident makes shifting of profits to an offshore location, such as Ireland, difficult. Alternatively the nature of their business may also make the separation of the returns to IP (which can be relocated) from other profits difficult.

After the relocation to Ireland of IP in 2015 by one or more US firms, two-thirds of the gross operating surplus arising in Ireland was attributable to US firms and under 10 per cent to firms from other foreign countries. By contrast, only 6 per cent of employment in Ireland was in US owned companies.

[8] In 1956 the law was changed to exempt profits earned from exporting from corporation tax. In 1980 this exemption was replaced by a 10 per cent rate of tax on all manufacturing firms. In the 1990s a 12.5 per cent rate was gradually applied to all sectors of the economy, being fully implemented by 2003.

The obvious conclusion from Table 1 is that US tax law has resulted in US companies transferring substantial profits to Ireland whereas, in the case of MNEs from other counties that account for the bulk of employment by MNEs in Ireland, they have not transferred much of their global profits to Ireland because of the nature of their business or because of the way the tax law is implemented in the country where the MNEs are headquartered.

The importance of tax law in determining the shifting of profits on US MNEs' IP highlights the need to separately identify foreign MNEs' activities in the output and income tables of the National Accounts.

5. IRISH NATIONAL ACCOUNTING ISSUES

Ireland joined the EU in 1973 and, since that date, the economy has become increasingly globalised. There have been a series of important developments as a result of globalisation which have affected the economy and its portrayal in the National Accounts over the subsequent 45 years.

The first development was the important role played by the low rate of corporation tax in attracting foreign MNEs to establish subsidiaries in Ireland. In turn they tended to be highly profitable, with some firms – especially from the US – transferring profits to Ireland.

The direct benefit for people living in Ireland from the activity of foreign owned MNEs is the wage bill and the corporation tax paid in Ireland (the contribution to NNI). The profits, after tax, flow back to the foreign owners of MNE subsidiaries in Ireland. Thus GDP, which includes the profits of the MNEs, is not as good a measure of the economic welfare of those living in Ireland as GNI, which excludes the after-tax profits.

By the end of the 1970s there was very substantial manufacturing activity undertaken in Ireland by foreign owned MNEs. The attraction of Ireland for MNEs derived from their ready access to the wider EU market, the fact that labour costs were significantly lower than elsewhere in the EU, a stable business environment and a low corporate tax rate.[9] As a result of the low corporate tax rate there was a significant incentive for MNEs to move profits to Ireland through transfer pricing (Conroy et al., 1998). As a result, the profits earned by MNEs have

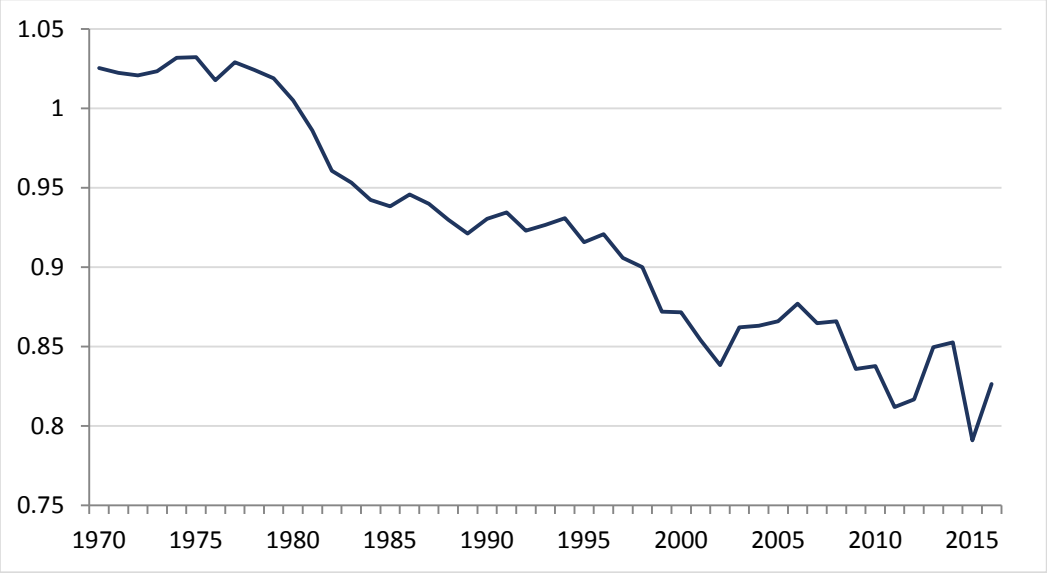
[9] Up to 1980 a zero rate of corporate tax rate applied to profits deriving from exports.

represented an increasing share of GDP over time, driving a growing wedge between GDP and GNI.

As shown in Figure 1, whereas in the early 1970s GNI was higher than GDP, by 1980 GNI was 5 per cent less than GDP as a result of the outflow of profits of MNEs. This gap between the two has widened over time and, since 2009, GNI has generally been less than 85 per cent of GDP.

In the 1970s the profits recorded as flowing out of the country were actual remittances, but there was a growing build-up of accrued profits, especially among US MNEs. This was not recognised in the National Accounts until 1984, when the profit outflows were shown on an accruals basis for the first time (Honohan, 1984). This resulted in a substantial upward revision in the deficit on the current account of the Balance of Payments, with serious implications for economic policy. (The deficit on the current account of the Balance of Payments was revised upwards from 12.5 per cent of GDP to over 15 per cent for 1981).

FIGURE 1 RATIO OF GNI TO GNP, CURRENT PRICES



Source: CSO National Income and Expenditure, 2016 and CSO Historical National Accounts.

More recently the National Accounts for Ireland have been significantly affected by a range of other factors arising from globalisation: the growth in activity by redomiciled PLCs; changes in patents of pharmaceutical companies; the growth of a large aircraft leasing sector; and, finally, the inclusion of IP in investment, interacting with changes in ownership of this IP (de Haan and Haynes, 2018).

National accounting rules have significantly affected how these developments have been represented in the National Accounts: in some cases their treatment in the accounts means that GNI, rather than GDP, is a reasonable measure of the income and welfare of those living in Ireland. However, the growth of redomiciled PLCs, and of the ownership of IP by MNEs located in Ireland has, in more recent years, also seriously affected the usefulness of GNI for the purposes for which National Accounts are used by policymakers.

A number of the problems with the Irish National Accounts have been discussed in earlier papers:

- Over the last few years a number of companies (referred to as redomiciled plcs) have relocated their headquarters to Ireland without generating any real activity in the economy in terms of employment or purchases of domestic inputs. The retained income of these companies adds to GNI while the income is actually attributable to the foreign owners of the companies. This means that GNI is no longer an appropriate measure of the income available to Irish residents. FitzGerald (2013b) and Avdjiev et al. (2018) discuss this issue in detail and the latest data for the net income of these firms are shown in Table 2.

TABLE 2 NET INCOME OF REDOMICILED PLCS AS % OF GNI

2008	2009	2010	2011	2012	2013	2014	2015	2016
0.2	1.1	3.7	4.0	5.0	4.2	4.1	2.3	2.5

Source: www.cso.ie/en/releasesandpublications/in/rpibp/redomiciledplcsintheirishbalanceofpayments.

- The pharmaceutical sector has grown in importance in the economy since the 1990s with the vast bulk of the output coming from foreign owned MNEs. By 2010 the sector accounted for almost 10 per cent of GDP. These firms are generally highly profitable, reflecting the huge IP involved in developing their products. This IP is protected by patents which have a limited life. When important drugs fall out of patent it can distort the figures for GDP. This problem was discussed in detail in FitzGerald, 2013a.
- Over the last 15 years aircraft leasing has expanded dramatically in Ireland, with most of the major MNEs engaging in this business having subsidiaries in Ireland. The national accounting treatment of this activity has been discussed in detail in FitzGerald, 2015. The CSO has recently published fairly comprehensive data on the sector, as shown in Table 3.

TABLE 3 AIRCRAFT LEASING SHARE OF KEY NATIONAL ACCOUNTS AGGREGATES, 2016, %

	%
Wage Bill	0.3
Gross operating surplus	4.7
Corporation Tax	2.5
GDP	3.0
GNI	0.2
Depreciation	8.1
Capital Stock, 2014	15.6

Source: www.cso.ie/en/releasesandpublications/ep/p-ali/aircraftleasinginireland2007-2016.

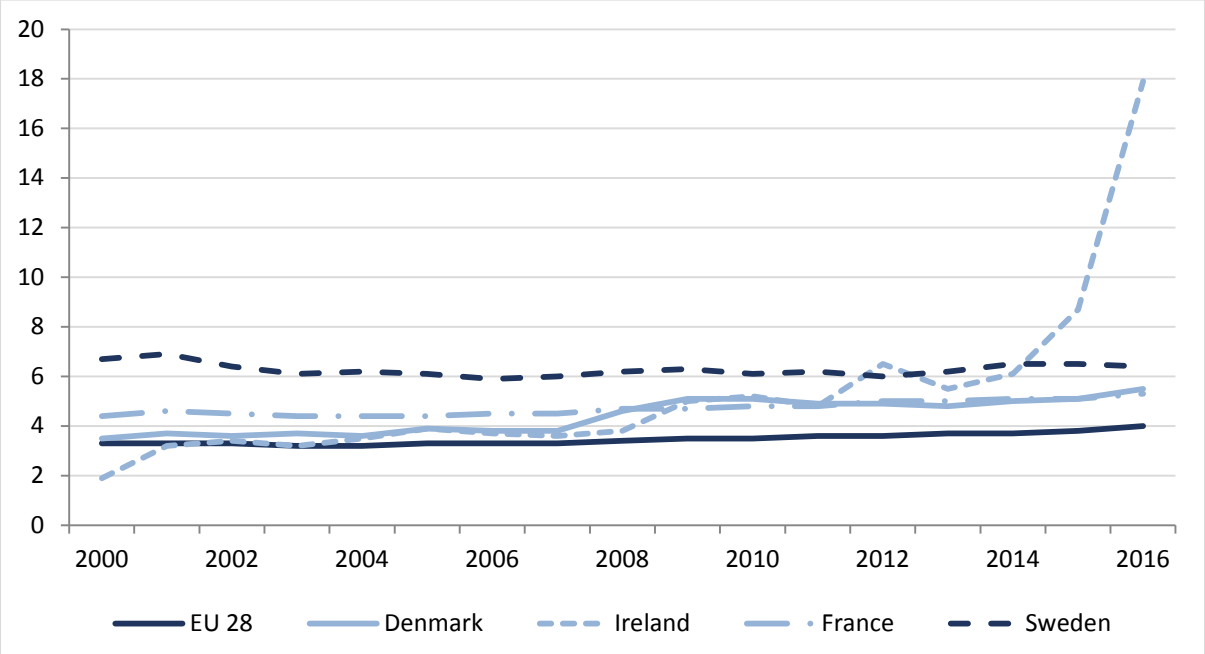
5.1 IP and contract manufacturing

The scalability of IP capital means that it can be, and has been, used to produce very large output of phones and computers. A second aspect of IP capital is that it can be exploited by workers (and physical capital) located in different jurisdictions than where the IP capital is itself located; it is separable from the other factors of production. This is very different from other capital, where the equipment has to be physically present in the country where the production takes place.

While IP plays a very important role in many industries, the Information Technology (IT) sector appears to be unusual in the extent to which the IP is separated in terms of geographical jurisdiction from the related physical production. The pharmaceuticals sector, which is also an important part of the Irish economy, and where production is dominated by foreign MNEs, uses very extensive IP in producing its output. The IP is either located in Ireland, where the production takes place, or is licensed by the Irish subsidiary from the parent MNE, appearing as an import of services. Thus the IP in pharmaceuticals is more closely associated with where the goods themselves are actually produced.

In the case of some key IT sector firms in Ireland, they have used contract manufacturing to undertake the production of their products, such as smartphones and computers. This contract manufacturing does not involve the transfer of the IP or the licensing of the IP to the contract manufacturer. As discussed in Section 4, this contrasts with the situation where a firm uses a subsidiary abroad, licensing the IP to that firm.

FIGURE 2 INVESTMENT IN INTELLECTUAL PROPERTY AS A % OF GDP



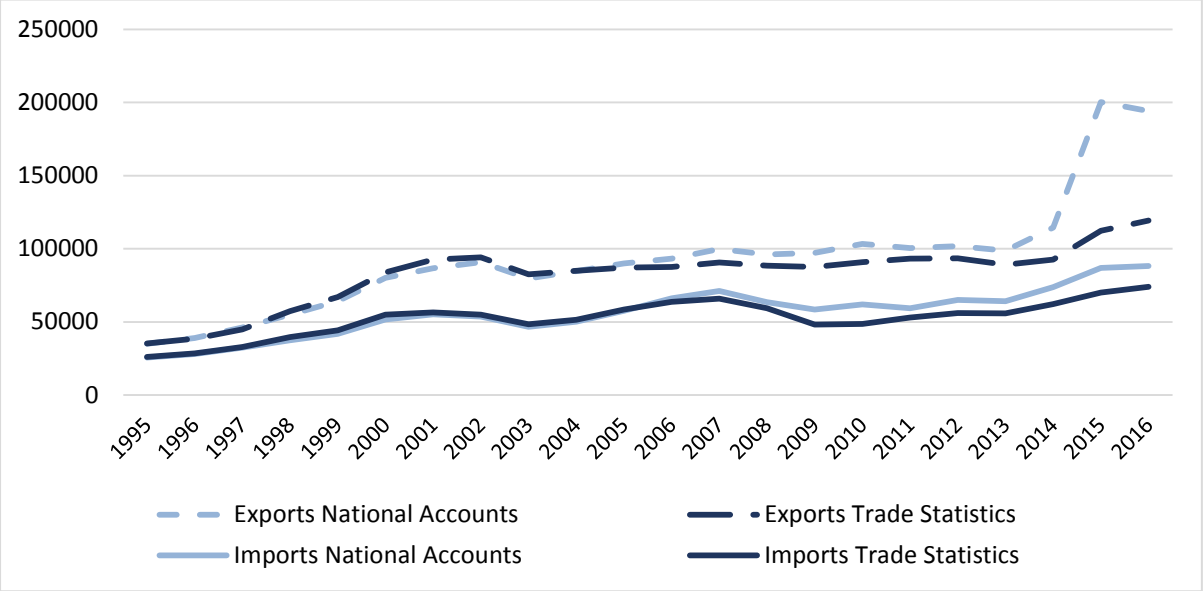
Source: Eurostat.

Since the early 2000s, there has been extensive investment in intellectual property by foreign MNEs. Figure 2 shows investment in IP as a percentage of GDP for Ireland and the other EU countries where it is also important. In the case of Ireland this investment represented between 3 per cent and 4 per cent of GDP for much of the last decade, rising to 5 per cent in 2009. The vast bulk of this investment was not produced in Ireland but was imported. The investment in IP is being undertaken by foreign MNEs who choose to operate in Ireland through subsidiaries of their parent companies.

The biggest shock to the Irish National Accounts in recent years has come from the once-off movement to Ireland in 2015 of IP owned by foreign MNEs. Because it was a relocation of the firms it did not show up in investment; instead the transfer shows up in the financial account of the Balance of Payments. This transfer of IP capital amounted to between €250 billion and €300 billion, increasing the domestic capital stock by 40 per cent in that year. The increase in the capital stock also amounted to over 100 per cent of Irish GNI.[10] In addition to the transfer of ownership of IP, there has been major additional investment in IP in 2015 (10 per cent of GNI) and in 2016 (21 per cent of GNI), which is also reflected in services imports of IP. As a result, the capital stock rose by another 10 per cent in 2016.

[10] It also represented over 2 per cent of US GNI.

FIGURE 3 TRADE ON A NATIONAL ACCOUNTS AND TRADE STATISTICS BASIS, € MILLION



Source: National Income and Expenditure and Quarterly National Accounts and Trade Statistics.

This movement of firms and their IP to Ireland was also associated with dramatic changes in the output recorded in the Irish National Accounts. The newly relocated firms used their IP located in Ireland in other countries, such as China, to produce IT products such as smartphones and computers. These operations were undertaken in the third countries on a contract basis rather than through a wholly owned subsidiary. The Asian firms undertaking the manufacture were paid a fee for the work, which covered the cost of the physical capital and the labour used in the production process. The difference between this payment to the firm manufacturing the goods and the value of the product produced (the profit on the goods), which embodied the parent firm's IP, is then considered as output in Ireland.

The fact that the actual manufacture took place in a third country and that the goods produced never pass through Ireland is irrelevant from the point of view of the National Accounts. What is crucial in determining where this output is located in the accounts is the ownership of the goods produced. If they had been produced by a subsidiary then the output, including the profit related to the IP, would have been located where the goods were physically produced. The profits would then have been remitted to the parent company, appearing as a factor flow in the National Accounts, but not in GDP.

Instead, the profit of the company owning the IP, which is the 'pure' return on the firms' IP, is treated as output in Ireland, and the full value of the goods

produced in the third country is treated as an export from Ireland in the National Accounts. This has seen a huge difference open up between the merchandise export figures on a trade statistics basis and the same item in the National Accounts (Figure 3).

In the National Accounts the relocation of these firms to Ireland accounted for much of the very large increase in real GDP in 2015 of 26 per cent. Obviously this increase in the output of the foreign MNEs, which is primarily reflected in an increase in their profits, only benefits those living in Ireland to the extent that corporation tax is paid in Ireland on those profits.[11]

GNI is arrived at by deducting the profits of the MNEs, after depreciation, as they are treated as being accrued to the foreign parent whether or not they are actually remitted in the year in question. However, because of the presence of these MNEs' very large stock of IP in Ireland, from 2015 depreciation accounted for by large foreign MNEs jumped from under €6 billion in 2014 to €29 billion in 2015 and €33 billion in 2016.[12] This massive rise in depreciation in 2015 accounted for much of the increase in GNI of around 16 per cent in that year. However, because the depreciation on the capital stock of foreign-owned MNEs does not benefit domestic residents, the resulting growth in GNI in no way reflects the change in welfare of Irish residents.

GNI was used by policymakers as a good indicator of what was happening to domestic economic activity over the last 30 years. However, as a result of these changes, it is no longer fit for this purpose.

As discussed later, to deal with this problem, the Irish Central Statistics Office (CSO) has introduced an 'adjusted' GNI, referred to as GNI*, which excludes the depreciation on foreign-owned IP and leased aircraft, and also makes an adjustment for the profits of redomiciled PLCs (CSO, 2017). Alternatively, Net National Income, which grew in nominal terms by around 10 per cent in 2015, would be an appropriate variable for domestic policymakers to target if it were also adjusted for the profits of redomiciled PLCs. However, in the case of both NNI and GNI* the CSO has not yet developed these series on a constant price basis.

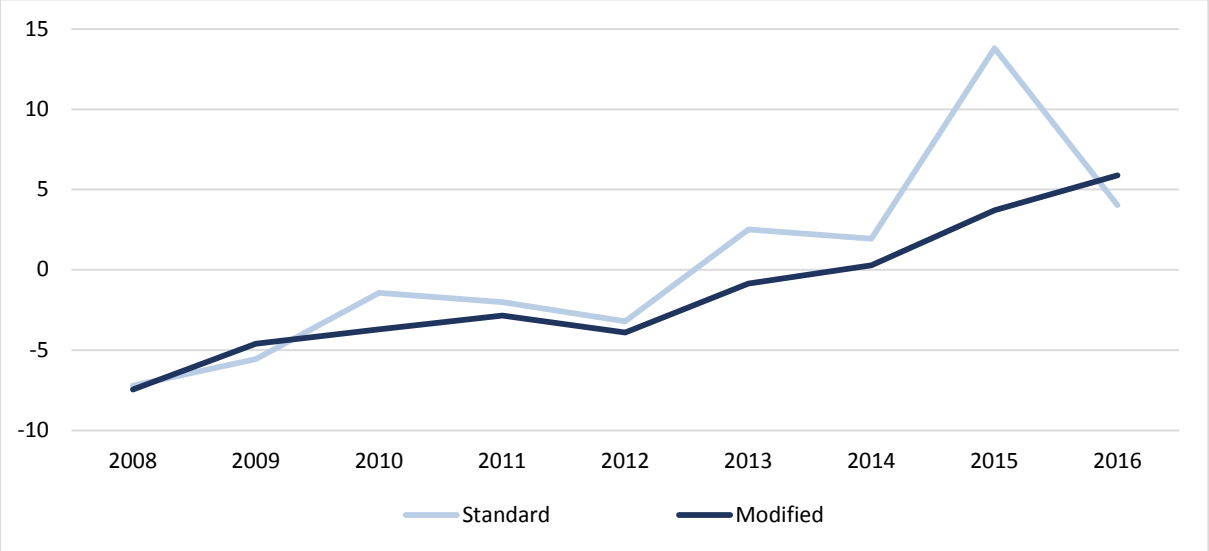
[11] Because Ireland's contribution to the EU Budget is based on GNI, part of the increase in corporation tax was offset by an increase in the EU budgetary contribution.

[12] www.cso.ie/en/media/csoie/newsevents/documents/seminars/globalisationinireland/Multinationals_in_the_Institutional_Sector_Accounts_-_Peter_Culhane,_CSO.pdf.

While the effects of the large IP related activity of foreign MNEs on the output side of the National Accounts is confined to the gross operating surplus in the sectors where these companies operate, the effects on the expenditure side of the account are more complex.

Investment in IP and aircraft for leasing accounts for a substantial share of total investment. The CSO publishes a figure for modified total domestic demand which excludes these components of investment. It gives a better picture of domestic demand of Irish residents.

FIGURE 4 CURRENT ACCOUNT OF THE BALANCE OF PAYMENTS, % OF GNI



Source: www.cso.ie/en/releasesandpublications/in/acabi/amodifiedcurrentaccountbalanceforireland1998-2016.

However, it can be very difficult to unscramble what is happening on trade: it is affected by the import of the IP and aircraft for leasing that are included in investment. There are also large amounts of contract manufacturing affecting both imports and exports. There are substantial services imports and exports in respect of the licensing of IP, and there is the repatriation of profits by foreign MNEs and the profits of redomiciled PLCs. This has made it very difficult to determine the contribution from trade with the outside world to domestic economic welfare.

Because of the complexity of the relationship between the domestic economy and the rest of the world, much of which arises from the effects of a large foreign MNE presence, it is also difficult to interpret the current account of the Balance of Payments.

As discussed already, the activities of redomiciled PLCs have served to artificially boost the surplus (reduce the deficit) on the current account of the Balance of Payments in recent years. The massive increase in depreciation in 2015 on the IP of foreign MNEs in Ireland also greatly magnifies the surplus. The gross operating surplus of these foreign MNEs includes the depreciation. While the net operating surplus, after tax, flows back out in factor income, this is not the case for the depreciation. Instead the write down in the value of the assets in Ireland is reflected in the financial accounts of the Balance of Payments. As shown in Figure 4, the effect of this relocation in 2015 was to produce a massive surplus on the current account reflecting the depreciation on the IP that relocated to Ireland. This makes the balance on the unadjusted current account useless for monitoring internal pressures in the Irish economy.

To deal with this problem the CSO has issued an adjusted current account balance as shown in Figure 4. This excludes imports of aircraft for leasing, imports of IP, depreciation on these two items and the profits of redomiciled PLCs. This provides a more realistic picture of the balance between savings and investment in the Irish economy. However, further work may be needed before this is a fully appropriate indicator.[13] In the next iteration the CSO will exclude exports of IP.

5.2 Problem for policymakers

The wide-ranging and complex effects of globalisation on the Irish National Accounts have made it very difficult for policymakers to understand what is really going on in the economy. During the recent crisis years the headline indicators of GDP and GNI, which are normally targeted by policymakers, were seriously distorted by the changing effects of globalisation on the economy. Today there are concerns as to how rapidly the economy may be approaching capacity. However, the problems with available national accounting data make it very difficult to assess the urgency with which corrective action should be taken.

[13] Coffey, 2017, http://economic-incentives.blogspot.ie/2017/10/the-current-account-where-do-we-stand.html.

TABLE 4 KEY NATIONAL ACCOUNTS AGGREGATES, GROWTH RATE NOMINAL AND REAL, %

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Current Prices										
GDP	6.6	-4.8	-9.4	-1.5	2.6	2.1	2.7	7.9	34.7	5.2
GNI	5.1	-4.6	-12.5	-1.3	-0.6	2.7	6.8	8.3	24.9	9.9
GNI*	5.1	-4.9	-13.6	-4.2	-1.0	1.3	7.5	8.0	11.9	9.4
Constant Prices										
GDP	5.2	-3.9	-4.6	1.8	3.0	0.0	1.6	8.3	25.6	5.1
GNI	3.5	-3.3	-7.6	3.3	-0.4	1.0	5.2	8.9	16.4	9.4

Source: CSO: National Income and Expenditure, 2016.

Table 4 shows the growth rate from 2007 for certain key aggregates in current and constant prices. (The adjusted GNI figure, GNI*, is not yet available in constant prices.) While GNI* in nominal terms is only a partial solution to the problems of interpretation arising from globalisation, it is a better guide to growth in the domestic economy than the more traditional measures of GDP and GNI.

As shown in the Table, GNI* shows a markedly different path than GNI or GDP from 2010 onwards. At the height of the crisis in 2010 it suggests that the economy was performing worse than would have been understood using GNI or GDP. It also suggests that the robust recovery may have begun in 2013 rather than in the second half of 2012. Finally, it provides a picture of a more stable, but still very rapid, rate of growth between 2014 and 2016, in contrast to the unbelievable picture from GDP and GNI. However, even GNI* looks to be on the high side, given what has been happening on the labour market.

5.3 Wider implications of developments in Ireland

Obviously the problems in interpreting the National Accounts for Ireland, identified in this section, are of primary concern to Irish policymakers. However, some of the changes in 2015 are big enough to be noticeable in the accounts for other larger economies, such as the US. Guvenen, et al. (2017) have considered how US output may be under-recorded as a result of the operation of US MNEs that own large IP. Given the size of the relocation to Ireland in 2015, and the fact that the companies involved were almost certainly US based, the changes in key Irish aggregates can also usefully be considered in terms of how the US National Accounts might have been affected if the relocation had been to (or from) the US.

TABLE 5 CHANGES IN SOME KEY IRISH NATIONAL ACCOUNTS AGGREGATES, % OF IRISH AND US GDP

	Ireland	Ireland	US	Change in Ireland as % of	
	2015, Change € m	2014 € m	2014 € m	Ireland	US
GDP	50,000	194,537	13,118,250	25.7	0.4
Exports	66,075	219,786	1,786,676	30.1	3.7
Depreciation	23,861	29,486	2,068,497	80.9	1.2

Source: Author's estimates.

Table 5 gives an estimate of the change in Ireland in 2015 of nominal GDP, exports and depreciation as a result of the relocation to Ireland of companies with very large IP. The increase in output attributed to Ireland added almost 26 per cent to nominal GDP. If the subsidiaries relocating to Ireland had instead relocated to the US it would have added 0.4 per cent to US GDP.

Similarly, the increase in exports of goods produced on contract in Asia amounted to 30 per cent of Irish exports, and would have amounted to almost 4 per cent of US exports. Finally, the increase in depreciation added around 80 per cent to the Irish aggregate and the change was equivalent to 1.2 per cent of the relevant US aggregate.

6. SOLUTIONS

The difficulties caused by the process of globalisation for national accounting obviously differ from one country to another. However, many of the problems faced in accounting for the Irish economy are faced by other economies, albeit generally to a lesser extent. To meet the needs of users of National Accounts significant additions are needed to the current standard accounting framework.

Both Eurostat and the CSO will, as the law requires, continue to produce the National Accounts on the SNA 2008/ESA 2010 basis. This means that the headline GDP figure will not be amended but will continue to be affected by the actions of MNEs that are resident in Ireland. However, while the law requires accounts to be produced on this basis, and these accounts must be used for certain administrative purposes in the EU, there is no restriction on the CSO (or Eurostat) from producing additional 'satellite' accounts, which could better meet the needs of most users of national accounting data.

In the case of Ireland, the CSO has already introduced a number of innovations dealing with some of the problems identified earlier in this paper. However, it would be beneficial for users of the Irish National Accounts if a comprehensive framework of satellite accounts could be developed that dealt with the aspects of the globalisation process that have already been identified as problematic for the standard accounting presentation. A range of suggestions is made in CSO, 2017.

The supplementary accounts that are needed should have a number of characteristics:

- Ideally they should be developed to meet the needs of all economies, to ensure transparency.
- They should provide a consistent treatment of economic activity over time. Serious discontinuities can pose major problems for policymakers.
- They should provide a good representation of the economic welfare of those living in a country.
- It is important that they are publishable without infringing on the confidentiality of data on individual companies (and households). This is a problem for small economies like Ireland. The supplementary accounts need to be robust: possible future changes in location by MNEs (or domestic firms) should not prevent the continuing publication of the series on confidentiality grounds.
- They should not be affected by changes by MNEs in the precise legal framework they use in the country where their goods or services are physically produced.
- The supplementary accounts need to deal with the problems affecting both the National Accounts and the Balance of Payments

There is unlikely to be a single framework of satellite accounts that will meet all these requirements. As the process of globalisation evolves, new problems will arise and new solutions will be needed.

This paper first considers three minor adaptations of the existing framework which would be helpful. It then sets out a simple set of indicators that could usefully be developed to provide additional information for users. Finally it considers features of a more detailed disaggregation of the SNA 2008 accounts that would provide a satisfactory framework for understanding the Irish economy.

6.1 Adapting the current accounts

As outlined above, the very extensive aircraft leasing business, which makes a small contribution to Irish GNI, greatly complicates some aspects of the National Accounts due to very large gross flows it generates. It is likely that the standard financial accounting treatment of this business may change in the coming years, with implications for the National Accounts. This would involve essentially treating this business as a financial sector enterprise.

In the aircraft leasing business planes are provided to airlines under a legal agreement that is rather similar to a mortgage. The planes are financed by loans, with the planes themselves as collateral. In the case of mortgages on houses the investment in the housing and the stock of housing is recorded in the National Accounts in the country where the houses are located and used, not where the banks providing the finance reside. However, in the case of aircraft they are currently recorded in the accounts of the country where the leasing company is located.

The possible change in financial accounting would see the aircraft recorded as the asset of the airline that is the lessee and the relationship with the leasing company would then be treated as a purely financial relationship. The fees received by the leasing company would be a service export from the country where the leasing company resides. This would eliminate the large investment, capital stock and depreciation from the Irish accounts, leaving the domestic value added by the leasing companies.

In the case of foreign MNEs that produce goods or services in Ireland, all of their after-tax net operating surplus is accrued as a factor outflow in the year in which it is earned, irrespective of whether a dividend is paid to the parent company. If a similar treatment were applied to the redomiciled PLCs, with their retained profits being accrued as a factor outflow, this would remove another anachronism from the Irish National Accounts.

Connolly (2018) suggests that some of the problems arising from the relocation of firms with a major stock of IP could be better handled in the long run if they were treated as financial enterprises; the ownership of the IP has been separated from its use and the owner in Ireland receives income in respect of this asset, just as an investment company receives income from its assets. As with a change in the treatment of the aircraft leasing companies, this could greatly simplify the National Accounts, especially of smaller economies such as Ireland where substantial IP is located. However, the downside is that at a global level it might

not adequately capture the key role that such IP plays in the global production process. It is a stock of capital that has been produced and must be located in some jurisdiction to be included in global measures.

6.2 Additional indicators

The CSO, as recommended in CSO, 2017, has introduced an adjusted GNI figure, referred to as GNI*, in its latest set of National Accounts. This measure adjusts GNI to exclude the depreciation of IP and leased aircraft and the retained profits of redomiciled PLCs. To date it is only available at current prices, which means that it cannot yet be used directly for fiscal policy purposes.

While this indicator is potentially more useful than GNI, it could need further changes if globalisation affected the economy in new ways. For example, if the pharmaceutical sector were to fully separate its IP capital from production, and locate such IP in Ireland, this would need a further change in GNI*.

GNI* is designed to mimic GNI as it is measured in many other countries. This should facilitate its use in Ireland for international comparisons. However, as it is a measure only used in Ireland it will not be universally understood. Thus the measure currently lacks transparency for international users.

Even within the current ESA 2010 data, Net National Income (NNI) is less affected than GNI by the problems that surfaced with the Irish National Accounts for 2015. The bulk of the activity of the MNEs that shifted to Ireland is effectively excluded from these aggregates, including the huge effect on depreciation. This may make it more useful than GNI*, which only excludes some of the depreciation of foreign MNEs.

However, NNI has, until now, only been available on a current price basis for Ireland, though the CSO plans to address this problem in future publications. In addition, it includes the retained profits of redomiciled PLCs. The exclusion of this latter item from NNI would produce a very useful variable for Ireland but, like GNI*, it would also not be well understood internationally.

The other problem with NNI is that, while it is included in the standard framework of National Accounts, little attention is given to it internationally, making it much less useful for the purpose of international comparisons. Part of the problem may lie with the fact that, while the CSO has done detailed work on

measuring depreciation, many other jurisdictions have paid less attention to this issue: as a result, GNI and GDP are considered a more reliable indicator of economic activity internationally.

The second essential indicator that is required is one for the balance on current account of the Balance of Payments. The two problems with the current measure for Ireland relate to the treatment of depreciation by foreign MNEs and redomiciled PLCs' retained profits. The CSO has recently published an adjusted current account figure for the Balance of Payments which excludes these items. However, further work may be needed on this measure. In particular, if depreciation of some major foreign owned MNEs is excluded, should depreciation of other foreign MNEs be similarly treated?

6.3 Satellite accounts

The effects of globalisation on the Irish economy permeate many of the items of the National Accounts. This makes it very difficult to understand developments in the economic welfare of those living in Ireland or to establish the productive capacity of the Irish economy. Even if one or two high level indicators of growth are used, such as GNI* or NNI, it is still exceptionally difficult to understand where this growth is occurring in the economy. Detailed knowledge of what is happening in the economy is vital for economic policy; it was part of the original justification for developing National Accounts.

Even before the latest difficulties with the Irish data, arising from relocation of IP, there were increasing problems in identifying where growth was arising in the Irish economy. While the foreign owned MNE sector contributes hugely to exports and industrial output, the sector also has massive imports and the very large profits from the sector flow back out of the economy. Thus, while the contribution of the MNE sector to the economy is undoubtedly very positive, it is difficult to identify just how much of the growth in the real economy in recent years has come from this sector and how much has come from domestic firms.

It is essential for economic policy that satellite accounts are provided to the standard National Accounts, identifying the contribution of different sectors to growth. Here this report concentrates on the additional information needed on the output and income side of the accounts.

Any new presentation of national accounting data must also ensure that confidential information on individual companies is not disclosed. This constraint

is important in determining the appropriate level of sectoral detail to present. If the sectoral breakdown is too fine then individual large companies may be easily identified. However, if there is inadequate sectoral detail it will be very difficult to understand what is driving change in the economy. While a particular level of sectoral disaggregation may be possible today without disclosing confidential information, new companies, or closure of existing companies, may make such a level of sectoral detail impossible in the future. Thus in choosing the appropriate level of sectoral disaggregation to use it should be robust to movement of companies in the future.

In the latest release of their Institutional Sector Accounts the CSO gives separate details for foreign MNE firms covered by their 'Large Cases Unit'. This shows the contribution of these firms to NNI – their wage bill and the corporation tax they pay. It also shows their depreciation and operating surplus. The CSO has also published data at current and constant prices on GVA arising in much of the foreign owned MNE sector and the rest of the economy at an aggregate level.[14] However, this release provides no information on either sectoral detail or on the breakdown between GOS, depreciation and the wage bill. The CSO has also derived experimental data on aggregate employment and wages in MNEs and the rest of the economy.

If these published statistics were greatly expanded to give sectoral detail and if the coverage of foreign MNEs was consistent (and complete) across the different publications, it would give a much better picture of where output, which contributes to NNI, is arising in the economy.

[14] www.cso.ie/en/releasesandpublications/er/gvafm/grossvalueaddedforforeign-ownedmultinationalenterprisesandothersectorsannualresultsfor2016. However, the coverage of MNEs is not complete so there may be some mismatch with the firms covered by the Large Cases Unit.

TABLE 6 ALTERNATIVE PRESENTATION

		e.g. Manufacturing		
		Total	Foreign	Domestic
Current prices	GVA Factor cost			
	Gross operating surplus			
	Wages			
	Stock adjustment			
	Non-Product Taxes			
	GDP Basic prices			
	Corporation Tax			
	GNI in sector			
	Depreciation			
	NNI in Sector			
	Deflator			
Constant prices	GVA Factor cost			
	Wages			
	Depreciation			
	National domestic product at factor cost			
	GVA Basic prices			
	Corporation Tax			
	GNI in sector			
	Depreciation			
	NNI in sector			

Set out in Table 6 is a proposed framework for expanding the accounts for the output side of the National Accounts to meet users' needs. Ideally these data should be provided for each sector of the economy (e.g. manufacturing, distribution etc.) cross-classified by foreign MNEs and the rest of the economy. This detail is needed to understand where growth is occurring in the economy and to understand developments in key aggregates, such as productivity.

For each sector, value added needs to be broken down into the wage bill, the net operating surplus, corporation tax and depreciation, and cross-classified by MNE and other (domestic) firms. The aggregate data for each sector are already available on this basis from Eurostat and the CSO. Some of the additional breakdown into MNE and 'other' is also available from Eurostat and the CSO. What would be needed would be to ensure that this breakdown by ownership was available for each sector where there was a mix of MNEs and other firms. If a

sector was predominantly accounted for by MNEs or else by 'other' (Irish owned) firms, then the breakdown would be unnecessary.[15]

GNI arising in a sector would then be the sum of the GVA in the 'Other' domestically owned sub-sector and the wage bill, depreciation, and corporation tax paid by the MNE sector. NNI excludes depreciation so that for foreign MNEs NNI would be the wage bill plus the corporation tax paid.

This breakdown, if applied on an annual basis would show the contribution to GNI and NNI from each sector of the economy. This would allow the growth in NNI to be decomposed both by the sector in which it occurs and also by whether it occurs in Irish owned firms or foreign MNEs.

One issue, which has not been discussed earlier, is the treatment of factor inflows. Where there are large Irish MNEs with operations abroad, the profits of these MNEs are included in factor income. This treats the activity abroad by MNEs as an investment that is not related to its domestic output. While this may be appropriate for some MNEs, for MNEs who have developed substantial IP and use it to produce goods or services abroad, an additional presentation might prove useful.

As discussed earlier, the result of the current national accounting treatment of such activity is that if a firm produces abroad through a subsidiary the profits will flow back to the owner of the IP as factor income. However, if the production abroad is done on contract, then the profits earned abroad are treated as part of the MNE's domestic output and included in the relevant sector's GVA. As discussed in Section 4, this difference in treatment leaves open the possibility of substantial discontinuities if an MNE changes the legal status of its operation in a third country.

To avoid this problem of possible discontinuities, one approach would be to include the factor income of MNEs as part of their output in satellite accounts. Then sectoral output would be unchanged if a domestic MNE moved from contract manufacturing abroad to operating through a subsidiary. This would be especially relevant where the profits were earned as a result of using IP. Such a change could have a significant impact on the accounts not only of the US, but

[15] It could also prove problematic to publish such data for confidentiality reasons if there were only one or two MNEs or 'other' firms in a sector.

also of countries such as Germany, where many of their MNEs have very large production undertaken abroad by subsidiaries. However, this alternative presentation would not be appropriate for many uses to which National Accounts are put. Because it would include in sectoral output production in other countries using foreign labour and physical capital, it would not be appropriate for fiscal or monetary policy purposes. Nonetheless, it would be a useful addition in a set of satellite accounts.

The attribution of profits from operations abroad would probably best be included in domestic output where these profits arise largely from the exploitation of the home country MNE's IP. Guvenen et al. (2017) attempt such an exercise for the US. However, it is difficult for most businesses to separate out the return on IP from profit reflecting the return on use of physical capital, making such an approach difficult for many sectors.

6.4 Alternative approaches to the expenditure side of the National Accounts

The CSO currently produces a measure of 'modified' domestic demand which excludes investment in IP and aircraft for leasing. These forms of capital are excluded because they are almost all used to produce output outside Ireland. This modified variable provides a better picture of what is happening on domestic demand.

However, to date, a suitable approach to trade and factor flows has not been established which can separate out the role of foreign MNEs and domestic firms. Without such separation between the activities of these two types of firms it is very difficult, using the expenditure side of the National Accounts, to establish the effects of trade on the economic welfare of those living in Ireland.

As a result of globalisation, foreign MNEs affect the external sector of the economy through a multiplicity of different channels. They may simultaneously export goods and import materials for use in domestic production; license IP for use abroad; purchase IP abroad; provide services abroad; receive profits from subsidiaries abroad and remit profits to their head offices. While for the larger foreign MNEs the CSO captures good data on all of these transactions, it is a much more complex task to derive appropriate deflators and maintain consistency with the available data on output.

In the past, much of the attention of those forecasting the economy has gone on the components of the expenditure side of the National Accounts. Thus the problems in interpreting what is happening on the expenditure side of the accounts are particularly difficult for policymakers. For example, both the Central Bank of Ireland and the Irish Department of Finance only provide detailed estimates of current and expected future economic activity on an expenditure basis.

A further problem with the trade data is that there are massive gross flows. In recent decades globalisation has seen production processes being broken up into multiple stages occurring in many countries. Thus the exports associated with the production of a car or a computer (including exports of parts) could end up being a multiple of the value of the final product. We have seen in the Irish input-output tables how the true domestic value added associated with exports, especially of services, has fallen over time.

This is not just an Irish problem. One approach suggested in Koopman et al., 2014, Rojas-Romagosa and van der Horst, 2015 and Los et al., 2016, would use input-output information to try and derive the domestic value added content in gross exports. If the data were readily available on a timely basis this might be a useful approach.

However, the detailed data needed to implement this approach are not available in a timely manner. If implemented it would involve using the latest available data to undertake the analysis but these data would, inevitably, be out of date. As we have seen in Ireland, there have been very rapid changes in the structure of the economy over time which could render such an approach unreliable.

7. CONCLUSIONS

Globalisation has changed the model that traditionally underpinned the National Accounts. Economic activity in one country is now linked to activity in other countries through many different channels. This interdependency of economic activity in different countries makes it difficult to identify the output of a particular country and to measure it appropriately.

The revisions to the System of National Accounts (SNA 2008) have tried to capture the effects of this globalisation process in a comprehensive fashion. The inclusion of IP in the capital stock has a strong basis in economic theory. However, possibly because of the concentration on capturing the effects of

globalisation in a comprehensive manner, the headline national accounting indicators now do not provide a useful guide for policymakers in countries such as Ireland.

In recent decades the growth of MNEs spanning the globe has driven a growing wedge between the output attributed to a country such as Ireland, measured by GDP, and the economic welfare of those living in a country, previously measured by GNI. While in the past GNI provided a good guide to the output and income available to those living in a country, this is no longer the case for Ireland because of the way globalisation has affected the behaviour of MNEs. The traditional indicators need significant adjustment to make them useful.

Probably the biggest distortion to the Irish National Accounts has arisen as a result of the inclusion of IP in the capital stock. This meant that the relocation to Ireland in 2015 of companies with large IP had a dramatic effect on the National Accounts. The fact that IP capital is scalable, in the sense that it can be used to produce unlimited output, and the fact that it is separable from all the other factors of production and can be combined with capital and labour in many countries to produce output, means that it does not fit well into the framework of National Accounts for a single country.

Also, the fact that the National Accounts treat activity undertaken by MNEs in third countries very differently depending on their legal structure in the third countries, can give rise to serious discontinuities if firms change that legal structure.

To deal with these problems it will be necessary to develop satellite accounts that separate out the activities of MNEs in each sector of the economy. This will allow policymakers to identify where growth is occurring in the economy and the contribution to growth that is coming from different sectors.

While the CSO has developed a headline indicator for the economic welfare of domestic residents, referred to as adjusted GNI or GNI*, this indicator could need further adjustment if there is a significant change in the population of foreign MNEs in Ireland.

While developing national solutions to these problems can meet the needs of domestic policymakers, this is not ideal: it lacks transparency at an international level. Because the national accounting problems discussed in this paper are not

unique to Ireland it would be better if there were some international co-ordination of the development of the necessary satellite accounts to understand how individual economies are really behaving.

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