



GDP and Globalization

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Abstract

The published increase of the real Irish GDP by 26 percent between 2014 and 2015 has raised serious questions about the interpretation and usefulness of the GDP concept and other national accounts aggregates resulting from the use of the 2008 SNA framework under increasing globalization. In this paper it is pointed out that the increasing “randomness” of the GDP is not caused by the changes introduced with the 2008 SNA, but rather by the lack of change to the SNA system in a fast changing world where the traditional measures may give results that do not sufficiently reflect the needs of economic decision makers. There seems to be an outspoken policy demand for a (supplementary) GDP concept that measures the creation of value added within the geographical boundaries of a country. A “Geographical” GDP is estimated for Denmark for the years 2005-2017 by adjusting the official GDP for value added generated by “production abroad” and for charges for the use of intellectual property (royalties and license fees).

¹ The main author of the paper is Bent Thage (bent.thage@gmail.com) while Peter Rørmose Jensen during many meetings contributed comments and practical statistical insight, and in particular arranged to get hold of the applied data, to which Lars Gustafsson and Brian Südel, both Statistics Denmark, also contributed significantly. The views expressed in the paper are those of the authors and do not necessarily reflect the opinions of Statistics Denmark.

1. Introduction

With the increase in globalization characterized by global productions chains and transactions related to intellectual property products, it has become obvious that under the current international standards (not least illustrated by the 26 percent increase in the real Irish GDP from 2014 to 2015) GDP does not measure well the value added generated by productive activities that take place on the territory of a country. The fact that the measured GDP does not relate to a “country” but to the value added of those enterprises that are resident in the country, no matter where in the world the counterparts to their transactions are situated, seems to have been a privileged knowledge of devoted national accounts statisticians.

The interactions between the definition of residents and a number of changes introduced with the 1993 SNA and the 2008 SNA and the increase in globalization has affected the national accounts in a way that may be contrary to the general objectives of the SNA. In particular the result may be volatile and abrupt changes to the GDP, complicating its traditional uses in economic analysis and for administrative purposes, and more generally undermining public confidence in national accounts statistics. Users must be confident that national accounts data can contribute to “informed decisions” as underlined in the Fundamental Principles of Official Statistics (UN 2014). It is important that those in charge of national accounts statistics observe the Fundamental Principles and do not give priority to facilitate either practical (easiness of compiling) or theoretical considerations (imputations based on abstract economic theory). As *The Economist* wrote: “One can hardly expect voters to embrace sound economics when the statisticians seem to be living in virtual reality” (*The Economist* 2016).

During the discussions about the future of national accounts that took place at the joint IARIW-OECD conference in Paris in April 2015 (Now documented in a Special Issue of *The Review of Income and Wealth*, December 2017) as well as in the Guide to Measuring Global Production (UN 2015), the main official document on this subject, there are numerous ideas and suggestions put forward, both for minor changes and for major reorganizations of the system of national accounts to better reflect the working of the economy under globalization. In the meantime this subject, not least fueled by the Irish case, has proliferated. In this paper no attempt is made to cover these current developments except taking them as a proof that national accounts have come under attack though increasing globalization.

The GDP has been at the forefront of much of the recent discussions, and this paper considers how GDP can be adjusted to better reflect the economic activity within the geographic boundaries of a country. The suggestions made are restricted to dealing with the goods and services part, and partly primary income. The objective is to estimate a “geographic” GDP² that is sheltered from most of the

² The term “geographic” GDP has been chosen for the lack of any better idea. This term is, however, not completely new. Thus the term “geographical product” was used by certain countries instead of GDP in the early days of national accounting (Vanoli 2005, p. 77), and the term is also used in connection with regional accounts in some African countries. The logical terminology would be to use the term GDP for the “geographical” GDP (noting the D), and reserve the term gross national product, GNP (which is vacant in the SNA) to represent the present GDP.

abrupt changes that may happen under the current SNA framework, and still (or therefore) be analytically useful.

For the “geographic” GDP to be relevant a number of conditions must be fulfilled. The value added is seen as earned where the goods are physically manufactured so that the adjusted GDP reflect the physical activity going on within the borders of the country. The adjustments are designed in such a way that the adjusted GDP is unaffected by legal reorganizations of enterprises, and in particular of multinational enterprises (MNE). The adjustments are general and not developed to deal with specific problems faced by a particular country. The adjustments are (largely) possible with existing data. The “geographic” GDP fits into the SNA framework, and is not an isolated ad hoc concept. Therefore the suggested adjustments are not limited to an alternative GDP only, but can be broadened to cover value added by economic activity and all categories of final expenditures in a consistent manner. There is no need to wait for changes to the SNA. The adjustments can be published in a standard reconciliation table along with the ordinary national accounts releases.

Whereas many suggested of the adjustments to the SNA to better handle globalization are dealing with alternative treatment of economic *entities* such as MNEs and particular types of institutional units such as “special purpose entities” or branches abroad, the adjustments suggested in this paper relate exclusively to types of *transactions*, no matter which kind of entities are involved. This makes the data more readily available as there is no need to go back to the primary data sources. The transaction based approach is feasible because the suggested adjustments relate only to transactions in goods and services and some primary income. The objective is limited to examining the possibilities of estimating a “geographic” GDP for Denmark for the period 2005-17 as a supplement to the official GDP, not as an replacement, nor is an alternative over-all accounting system suggested.

A pragmatic approach is chosen, and fine points about theoretical perfection are not pursued. The method chosen is to deduct from the official GDP value added generated by Danish residents in connection with physical “production abroad”, and add value added generated by non-residents in connection with physical production in Denmark. “Production abroad” follows current definitions of “goods sent abroad for processing” and factoryless production, FGP, (ECE 2015). Formally these adjustments are similar to the adjustment made when moving from the domestic to the national concept of household consumption expenditures by adding “Final consumption expenditure of resident households in the rest of the world” and deducting “Final consumption expenditure of non-resident households on the economic territory”. In the calculations *construction works abroad* are also included, though this category is not usually mentioned together with processing and FGP. It has been given a high priority that the data needed to derive the “geographic” GDP are already available (or should be so) in the existing statistical systems. Where the data required for deriving the suggested adjustments are missing it is mainly because the change of ownership principle for exports and imports introduced with the 2008 SNA has not yet been fully implemented.

The above adjustments for “production abroad” will remove the effect on GDP of (net) physical production abroad, and thus for this kind of production also the effects of corporate inversion (migration of the headquarters of MNEs). The value added generated by physical production will be referred to the country where production actually takes place and not move between countries with affiliates or headquarters. But for intangible property rights and the related payments for their uses, royalties and license fees (R&L) the situation is different. For intangible property rights it is very difficult or impossible to establish their physical presence relative to where production takes place. Their only definite location is characterized by legal ownership. Therefore current R&L can be significantly affected by strategic business decisions, primarily by MNEs. Intangible assets can be transferred from a parent to an affiliate abroad; the headquarter can be relocation to another country, by transferring ownership of intangible capital to a separate unit flows of R&L can arise where previously no such transactions were recorded etc.

In relation to intangible assets GDP is only affected by the *actual* payments for their use. The present calculations are therefore not directly concerned with the value of intangible assets or the residency of the owner. The fact that the asset may give rise to consumption of fixed capital is of no relevance as long as only gross value added is considered. In many cases there may be no actual transactions in R&L as the owner of the asset is the only user. Actual transactions in R&L can only occur when there is a user different from the owner, but may between associates take place without compensation, and thus not affecting the GDP. The actual transactions in R&L are only weakly connected to the productive system and may show large changes that do not reflect commercial rationale economic transactions, but nonetheless result in disruptive changes in the GDP compiled according to the present SNA framework.

In the adjustments suggested in this paper to obtain the “geographic” GDP the problem of volatile R&L is resolved by reclassifying these transactions from payments for services to property income. R&L were classified as property income in the SNA prior to the 1993 SNA (1953 SNA p.34, 1968 SNA par.7.52 and 1993 SNA par. 7.13 and p. 660). Royalties and license fees paid for the use of land and subsoil assets are called rent in the SNA and have always been treated as property income. More generally it lends support to this reclassification that most transactions in R&L may hardly fulfill the conditions for being related to production in the sense of the SNA, as practically no input of labor or tangible capital is associated with the current transactions. Again a pragmatic approach is chosen, avoiding digging into organizational details for individual enterprises, and relying on data that are readily available.

The contents of this paper are the following: In section 2 the need for a “geographic” GDP is discussed, mainly with reference to recent statements and works by various international organizations. In section 3 the way the SNA takes globalization into account is discussed, pointing out that the present problems do largely not follow from the changes made with the 2008 SNA. Section 4 outlines how the problems related to treatment of intangible property rights in national accounts have close counterparts in the

current international discussions on tax avoidance by MNEs. Section 5 documents the practical calculation of the “geographic” GDP.

2. The need for a “geographical” GDP

The reactions to the Irish case have pointed to a need for an alternative or additional GDP measure that would be confined to the value added generated within the geographic boundaries of the country. In fiscal, monetary, social and environmental policies decision makers are primarily concerned with activities physically located in the country over which they have jurisdiction. Thus the 2016 IMF Article IV mission to Ireland (IMF 2016b) wrote in its report: “If staff were to include the revised national accounts figures [with the 26 percent real growth rate] into the macroeconomic framework, it would distort the true representation of underlying economic developments and the headline ratios to GDP. This could lead to incorrect analysis and policy conclusions” and further: “Staff now recommend that the authorities develop additional metrics that better reflect Ireland’s underlying economic activity, to support policymaking and communications to the public”.

More recently the 2018 Article IV Report (IMF 2018a) noted: “Owing to the significant globalization of its economy and the large presence of foreign-owned multinational enterprise (MNEs), Ireland’s headline GDP and GNP figures, although computed in line with international statistical standards, no longer provide an accurate measure of domestic economic activity” and “Directors welcomed the publication of additional statistics that aim, inter alia, to filter out the impact of multinationals’ activity, and to allow a more accurate assessment than GDP of domestic economic developments and better inform policy-making. They encouraged continued efforts to provide more granular and frequent information in this area”.

The last quote above refers to the “Modified gross national income at current market prices” developed by the Irish Statistical Office (CSO 2016 and 2017)³ and since July 2017 published alongside the regular national accounts releases. This new concept is calculated as GNI less Factor income of re-domiciled companies less Depreciation on research & development related intellectual property (IP) imports less Depreciation on aircraft leasing. It is not obvious whether this is an attempt to estimate a more “correct” GNI, including only income that are at the disposal of the Irish population, or if it is aiming at estimating an alternative GDP better reflecting production in the geographic area. Anyway it seems tailor-made to the specific Irish situation and hardly generally applicable as a standard alternative concept.

One problem with disruptive growth rates is that in many uses, and in the longer run, it is not possible to “footnote” the problem away, and the absurdity of the GDP growth rates will spill over into analytical results that will be meaningless or misleading. Thus in the recently published OECD *Compendium of Productivity Indicators 2018* (OECD 2018a) the effects of the 26 percent real increase in the Irish GDP from 2014 to 2016 are highly visible. When aggregate labor productivities are

³ A comprehensive overview of the Irish case is given in (IMF 2016a, p.43-45)

calculated for the two sub-periods 2001-07 and 2010-16, based on total GDP and employment, Ireland does not stand out in the first period, but has an average annual increase in productivity of more than 6 percent in the second period. This is more than twice the productivity growth in any other country, and 5-6 times more than the average productivity growth in EU28 and OECD. For manufacturing the Irish average annual labor productivity 2010-16 increases 16 percent compared to around 2 percent for EU28. When it comes to average growth in GDP 2010-16 Ireland is matched by only China and India. In all of the tables and graphs shown Ireland stands out as an extreme outlier. Also when it comes to the *levels* (US dollars per head of population, PPP) Ireland is in 2016 second to Luxembourg only and with a large step down to the next on the scale, Switzerland.

Of course the OECD experts were well aware of these problems as reflected in the following note: “In Ireland, corporate restructuring, including through the relocation of firms with significant intellectual property assets and aircraft leasing companies, led to significant increases in GDP and labor productivity in 2015, leading to the highest annual post-crises labor productivity growth rate among OECD member countries (6.2%)” (OECD 2018a, Box. p.40), and about the sharp decline in wage share: “partly reflecting relocations of firms with high knowledge based assets in 2015” (OECD 2018a p. 15). But these comments do not appear with the individual tables and graphs, which readers may take to be valid analytical results. Nowhere in the publication is it mentioned that the Irish GDP increased by 26 percent in 2015. The information value of calculating averages for periods of time with this single jump included is doubtful, and it is problematic to interpret annual averages for the period as productivity in the normal understanding of this term. The Irish GDP jump also affects the averages for country groups. These communication problems are further underlined with the *OECD Statistics Newsletter* July 2018 (OECD 2018b) which reproduces the main graph from the *Compendium* with the outstanding Irish productivity increase without any comments.

In the *Compendium* an alternative summary calculation where GDP is replaced by GNI partly “corrects” for Irish peculiarity. Not surprisingly the productivity for Ireland based on GNI is much lower than when based on GDP (40 percent above the OECD average compared to more than 80 percent above). Interestingly the main reason given for this alternative calculation is “It is a stylized fact that intangible capital plays an increasingly important role in growth and productivity. But less well known are the potential measurement challenges these bring, in particular with regards to whether the underlying use of the intangibles is recorded in the accounts as generating cross-border service flows – which increase GDP – or cross-border flows of primary income, recorded in GNI. This matters for labor productivity measures”, and further “In this regard productivity measures based on GNI are able to provide a complementary view that may shed light on possible measurement distortions” (OECD, 2018a, p. 44).

Considering the reasoning behind the Irish “Modified gross national income at current market prices” (CSO 2016 and 2017) it is, however, not obvious how GNI, which is an income concept, should represent a relevant numerator in productivity calculations. Thus the dividends involved in moving

from GDP to GNI are exclusive of consumption of fixed capital (here the business accounts depreciation, not for good reasons the national accounts estimates) and corporate taxes, and it is necessary to define a volume measure for GNI. This GNI based productivity estimate seems to be based on the assumption that the current payments of R&L that now adversely affects the calculation of the GDP are being (partly) eliminated by replacing GDP with GNI in the formula. However, the logical approach would be reclassify all R&L from services to property income, not depending on whether they gave raise to dividends or not. But this change cannot be accomplished just by looking at the difference between GDP and GNI, as the redistribution process for primary income is several accounting steps away from the GDP related problem.

In the article *Globalization at work in statistics – Questions arising from the “Irish case”* (Stable-Weber and Verrinder, EURONA, 2016) it is stated that “The challenge we face now (not only) in Ireland is that Gross Domestic Product (GDP) and Gross National income (GNI) no longer really provide useful insights into the economic activity that is physically taking place in the national territory, as such domestic production can be dwarfed by globalization activities. This raises concerns with regard to the actual value of those figures and the insights on the domestic economy that can be taken from them”

Though the article does not provide any solutions it presents a very illustrative exposition of the problems related to production abroad, the relocation of MNE headquarter and the mobility of the intangible assets. The main messages are that (within the existing SNA and ESA standards) the accounts should be presented in a “building blocks” manner that enable users to distinguish domestic and globalization impacts and that statisticians should be provided with the information needed for this purpose. The article may go too far in indicating that a geographical territory version of GDP would be obtained mainly by limiting the relations to the rest of the world to what is recorded in cross-border trade statistics. However, the “building block” approach is also pursued in the present paper, though taking a transaction based rather than an enterprise based approach.

No matter how interesting the Irish case may be in its own right, the reason why it has attracted such attention among compilers and users of national accounts statistics is of course that similar cases can happen in any country overnight (it may actually already have happened in countries that have not yet discovered it and may never do so). Suppose something of a similar scale happened to Greece. With the present assessment metric the country would have made a big step out of the crises. But the problems of real concern are not limited to those very spectacular cases. It is of more general interest how these globalization issues affect “normal” GDP growth rates, which may then be interpreted incorrectly. Did the growth record really improve from 1 to 2 percent, or did a MNE just put up a brass plate at the entrance of an almost empty office or did a suspicious payment related to IPP occur?

A recent example for Denmark related to an R&L transaction in Q1.2017 illustrates this. An R&L type export corresponding to 0.5 percent of GDP was reported to the BOP, but it was not clear whether it

originated from output, a negative investment, or perhaps was not a service at all. This uncertainty about the classification was explained with the releases, and with the first release a graph with two alternatives GDPs for the quarter were published (Statistics Denmark 2018a). With later releases the transaction was preliminarily treated as output (increasing the annual growth rate by 0.4 percent, and significantly the quarterly rate four times more). A note in the release still refers to limited information, most recently in (Statistics Denmark 2018b). The IMF Article IV mission 2018 to Denmark (IMF 2018b) noted that: “Nevertheless, the external demand picture is slightly distorted by a one-off overseas payment for the use of a Danish owned patent, which accounts for the bulk of the contribution from net exports”. At present the situation is that either the 2017 GDP growth rate decreased from 2.0 to 1.9, or it increased to 2.3.

Another major problem with the new volatility of GDP arises in connection with forecasts. Thus the *OECD economic outlook* (OECD, 2018c) notes for Ireland that exports of goods produced abroad under contract from an Irish based entity of a MNE is assumed to remain at the 2017 level in 2018 and 2019, and the forecast for GVA is made “excluding sectors dominated by foreign owned MNE”. Thus forecasts may de facto be made for a “geographic” GDP rather than for the actual GDP. For quarterly accounts the same problem arises, as the information needed to correctly take production abroad and transactions in intangibles into account (in particular with corporate inversions) may be missing or incomplete, so that the first releases may be close to a “geographic” GDP. In both cases there may be a tendency to increased disparities between the first published figures and the final GDP.

3. SNA and Globalization

The SNA did not change

It may be tempting to infer that the disruptions to GDP caused by globalizations are consequences of the implementation of the 2008 SNA introducing changes related to production abroad and the shift from the border-crossing principle to the change of ownership principle for exports and imports of goods. This is, however, not the case, although, depending on the specific compilation techniques applied by countries, there may in practice be some minor effects.

National accounts have since the very beginning been based on the change of ownership principle. Thus (1953 SNA, p.31) states on international merchandise trade: “This item shows the gross movements of goods from domestic to foreign ownership”. This principle has never been challenged during the various versions of the SNA. The introduction of the change of ownership principle for exports and imports of goods with the 2008 SNA can be seen as a purely logical cleaning up in the system. The inconsistent principles of recording were replaced with consistent ones, complying with the over-all use of the change of ownership principle in the SNA. The timing of this change may reflect the fact that statistics based on the border-crossing was to an increasing extent no longer a good approximate measure for a change of ownership recording.

The change with the 2008 SNA to record exports and imports according to the change of ownership principle instead of the border-crossing principle does not affect the GDP. In the ideal SNA world the GDP from the production side is derived by adding up the entries in the primary statistics based on the profit and loss accounts of all resident enterprises (forgetting about the non-market and imputed own-account output in this connection) making no distinction between transaction counterparts according to residency. The recording of sales and purchases in the business accounts and in the national accounts is based on change of ownership. For the final uses the sale and purchase transactions directly give household final consumption expenditures and gross fixed capital formation, and in principle ownership based exports and imports.

For the production side estimates there is the practical complication of deriving the SNA concepts of output and intermediate consumption from the sales and purchases by estimating changes in inventories (usually by approximate methods). This, however, does not change the over-all ownership principle. Formally there was never a “golden age”, where GDP exactly measured the economic activity within the geographic boundaries of the country.

On the expenditure side there will of course be changes to exports and imports with the introduction of the change of ownership principle. However, these changes should in principle be absorbed by the other categories of final expenditures, as a previous inconsistent system at the product balance level has now been replaced by a consistent one. Thus this change should be a clear improvement even if it may in practice not have been fully implemented.

What really happened was not that the SNA changed, but that the *real world* changed. Over the last 10-15 years the share of the resident units’ economic activities taking place outside the geographic territories of their own countries has been increasing fast. This is also reflected by the increasing disparities between the border-crossing measure and the ownership based measure of foreign trade in goods that now, with the ownership principle introduced with the 2008 SNA, becomes very visible. This reflects actual changes in the economic realities, and not definitional changes following from changes to the SNA. And the changes to the SNA related to ownership do not, as outlined above, lead to changes in the GDP. Some countries, for example Norway (Evensen 2015) and the USA (BEA 2014 and 2017) have not yet introduced the change of ownership principle for foreign trade statistics in their national accounts. In both cases practical difficulties and lack of statistics is mentioned, but also that this change is not seen as urgent as it will not affect the GDP.

Whereas GDP will formally not be affected by the introduction of the change of ownership principle for foreign trade, then GDP will obviously be affected by the “owners” changing their residency from one country to another. This is not a new phenomenon, but again the news is that economic realities are changing fast, so that corporate inversion (migration of head-offices) of MNEs is now much more frequent than earlier, often reflecting tax-minimizing behavior. The effects of corporate inversion are reinforced if the relocation involves the simultaneous movement of economic activities (processing,

FGPs) that take place outside the geographic boundaries of the new home country. The fact that transactions related to use of intangible property rights are classified as payments for services exacerbates the effects on GDP.

The concept of “economic ownership” introduced with the 2008 SNA complicates matters. In their financial statements enterprises can for good reasons not take this SNA concept into account, nor can it be done in current primary statistics. All transactions with affiliates and other counterparts will appear at face value as actual market transactions (where risks and benefits have been transferred). When compiling the national accounts it may in principle be decided to ignore certain transaction when it is assessed that risks and benefits have not been transferred. With such decisions value added can be moved across countries, and operating surplus may be replaced by property income and vice versa. However, in practice it is hardly conceivable that national accounts compilers should be able to (or have resources to) assess individual transactions for type of ownership (except for conventional cases such as financial leasing).

Should the SNA be changed to better reflect globalization?

The 2008 SNA represents basically *no change* to the system of national accounts in a world of fast increasing globalization. There is now evidence that the current SNA framework may lead to non-sensible results. There is also a manifest demand for a GDP concept that better reflects the economic activity on the territory of a country. There are several alternatives when responding to this situation. (1) If it were decided that a GDP concept covering the geographic territory should be the official one it would imply major changes to the present SNA framework. (2) A more limited approach would be to give a special treatment to certain types of residency and flows that now represent the main risks for disruptive changes to the GDP. This would also lead to a different official GDP. (3) An even less drastic method would be to define measures supplementary to the official ones, and restricted to the goods and services part of the system, where the main problems are concentrated.

Regarding the first alternative it may be asked if the change of ownership principle was chosen already from the earliest national accounts systems because of a well-considered preference for this approach or just for practical reasons related to available data sources. In the latter case the tacit assumption may have been that the ownership principle would represent a good approximation to the measure of the economic activity within the geographic boundaries of the country, which was ideally what the GDP was designed to measure (D for domestic!). The 1953 SNA talks about domestic territory rather than economic territory when defining GDP (UN 1953, p.7) and anyway there was previously very limited “production abroad” even at the time of the drafting of the 1993 SNA. If the “geographic” GDP was accepted as the official one, and the over-all SNA system adjusted accordingly it would probably lead to a complicated accounting system that would have serious practical and methodological drawbacks. For example value added generated by “production abroad” would have to be reclassified to property income originating in notional institutional units set up as residents in contractor countries, and trade

would be fully on border-crossing basis. The creation of notional institutional units in connection with “production abroad” would have some similarities to what is now recommended for major construction projects abroad.

Not so long ago the GDP generated within the geographic territory of a country and the GDP generated by the enterprises resident in that territory were for all practical purposes identical. The geographic interpretation of the GDP has been predominant in analytical and policy uses, in many economic text books, in the media and by the man in the street⁴. This notion of the GDP concept has been so deeply rooted up to this day that the Irish case was needed to fully realize the treacherous potential of the present SNA framework. On the background of this broadly based geographical understanding of the GDP measures, a real annual increase in GDP of 26 percent is of course an absurdity, no matter how much it is claimed to be in compliance with the current SNA standard. Somehow a fundamental measuring rod has lost its function. This is also a reminder that the GDP concept has reached such prominence in society that the national accounts community is no longer the “owner” of this term, but rather its servant that have to make sure it makes sense.

The approach chosen in the present paper is basically the third one mentioned above. A supplementary GDP concept, the “geographic” GDP is derived by deducting from the official GDP value added generated by Danish residents in connection with “production abroad”, and add value added generated by non-residents in connection with production in Denmark. In addition R&L are reclassified from services to property income. The “geographic” GDP fulfils a double purpose. It delimits the production covered by this alternative GDP concept to the geographic territory of the country, and it eliminates the arbitrary influence of R&L paid for the uses of intangible assets for which it is difficult or impossible to establish their physical presence relative to where production takes place. The R&L classified as services may randomly affect the GDP. The reclassification of R&L to property income is further supported by the fact that it hardly fulfill the conditions in the SNA for being production, as practically no input of labor or tangible capital is associated with the current transactions.

If R&L were more generally reclassified to property income, as suggested in (Lynch and Thage 2017) these transactions should only be classified by institutional sector. This will evade the unmanageable problem of allocating these services to the economic activities where they are actually used in production. A further advantage would be that volume estimates would no longer be required, bypassing another difficult problem.

The suggestions in this paper to compile a “geographic” GDP do not include any changes to the current SNA standard, but calculations of alternative concepts only, and a reconciliation table connecting the

⁴:For example “Note that GDP measures the total amount of goods and services that are produced within a country’s geographic borders” (Miller and Blair, 2009, p. 134) and “Gross Domestic Product is defined as the sum of all goods and services produced in a country over time, without double counting products used in other output” (OECD Observer 2005), and “GDP counts all the economic output generated within the nation’s boundary” (Coyle 2014, p.25)]

official GDP with the “geographic” GDP, as outlined in table 4 at the end of this paper. Even though the present calculations are carried out at the level of total GDP only, they can easily be extended to cover value added by economic activities as source data are reported by units classified by economic activity. The effects of the adjustments on the production side can be traced to the expenditure side, and an adjusted expenditure side GDP equal to the “geographic” GDP derived. The suggested adjustments can be limited to an alternative GDP only or expanded to cover a “subsystem” covering the real part of the economy, including production and generation of income accounts, as well as the goods and services account. Without going into details it is noted that this type of adjustments to goods and services also to some extent is applied when constructing inter-country input-output tables, where the border-crossing based foreign trade statistics play a central role. Recently this is demonstrated by the Figaro project (Eurostat 2018) and the OECD Trade in value added project (OECD 2017).

The pragmatic nature of the suggested adjustments is important. All the adjustments can in principle be implemented by the use of figures that should be available in published official statistics, when the 2008 SNA and the BPM6 are fully implemented. Thus the changes made with the 2008 SNA, though not affecting the GDP, have brought about the collection of the data (transactions related to processing and FGP, as well as R&L) needed to derive the “geographic” GDP.

The possibility of a stabilized GDP

The GDP under the existing 2008 SNA standard and continued increase in globalization will tend to be a kind of random figure, in particular in smaller countries. This follows from the huge underlying potential for corporate inversions and the increased easiness of moving headquarters and setting up new affiliates (worldwide there are millions of MNE, and even non-MNE can formally relocate to another country). Similarly, in addition to the intangible property rights that have already been capitalized in the *business accounts* there are potentially gigantic amounts that have not yet been activated but with short notice can be so and significantly changing the economic picture of a country. It has been estimated that the four major international accounting firms world-wide employ as many as 100,000 to 200,000 tax advisors fueling this process on a day-today basis (Richard Murphy and Salla Naomi Stausholm, 2017). Their number and expertise can neither be matched by tax administrations nor by statistical offices. The potential corporate inversions and R&L services flowing from tax motivated transactions in intangible property rights may dwarf the traditional national accounts figures in the same way as if the value of leisure or household work were to be included in the GDP.

Explanations and footnotes with current national accounts releases can seek to inform users about the effects of major globalization related events, probably more or less trying to assess what the growth rate in the corresponding “geographical” GDP would have been. In this connection it is important to be aware that time series of national accounts data may be the only generally accessible macro-economic statistics to survive in the long run. In one hundred years users may not be interested in reading footnotes and will probably anyway be unable to understand their implications. The question of the

meaning of comparability over the very long time span has always been a difficult one, but it has never been related to the geographical coverage as now under globalization (except of course where borders have actually moved). Bridge tables do not solve the problem when quite different worlds are being measured. Spectacular entries caused by corporate inversions or major transactions in intangible rights may also necessitate suppressing information by aggregation, and thus making the national accounts even less informative.

4. National accounts, intangibles and taxation of MNEs

It is well-known that the substantial increase in the integration of national economies and markets has created problems not only for national accounts but also put a strain on the international tax rules. It may be less well-known that the problems faced and the discussions taking place within the national accounts community and the tax administrations are to a large extent dealing with the same kind of problems. This is the case both concerning methodological aspects and practical implementation, and in particular focused on the questions about where economic activities take place and value is created.

The international discussions and initiatives on the taxation of MNE in a globalized world are primarily taking place within the OECD with the Base Erosion and Profit Shifting (BEPS) project as the central one. Its main objective is to restore confidence in the tax system and ensure that profits are taxed where economic activities take place and value is created. Transactions in intangibles are at the core of the problems dealt with in the BEPS project: “Misallocation of profits generated by valuable intangibles has heavily contributed to BEPS, again based on misallocation of risks and not commercially rationale transactions”. And a main objective is to “better align operational profits with the economic activities which generate them” (OECD 2015a p.15). The risk of accepting these transactions at face value in the real part of the national accounts is that the GDP may reflect tax minimizing behavior of MNEs rather than the underlying economic realities.

In 2013 OECD and the G20 countries adopted an Action Plan that identified 15 actions along three key pillars of BEPS: introducing coherence in the domestic rules that affect cross-border activities, reinforcing substance requirements in the existing international standards, and improving transparency as well as certainty. A comprehensive package of reports and recommended measures has resulted from this work. The BEPS package is designed to be implemented via changes in domestic law and practices, and via treaty provisions. The related treaty measures were signed by 67 countries in June 2017, paving the way for implementation of the treaty related measures. It was noted that globalization requires that global solutions and a global dialogue be established which go beyond OECD and G20 countries. The BEPS implementation package includes a standardized approach to transfer pricing documentation. Country-by-Country reporting, with exchanges scheduled to begin in June 2018, will see tax administrations worldwide collect and share detailed information on all large MNEs doing business in their country. This reporting system should force taxpayers to articulate consistent transfer price positions across countries. (For more information see reference to the BEPS web site)

The resources currently devoted to the BEPS project are huge compared to those available for the globalization exercises carried out within the national accounts community. The already published reports cover thousands of pages, and consultation responses etc. many more. This material illuminates in great detail real world problems and practices and is highly relevant for national accountants. It deals with important issues that are also central for established national accounts recommendations on residency; economic vs. legal ownership, including the question of allocation of risk; transactions in intangibles and their valuation; research and development and the related assets, if any. Even though the BEPS project deals specifically with MNE, the insight presented has broader implications.

The BEPS project is according to its purpose primarily concerned with where “profit” arises and does not care about national accounts categories such as type of income (operating surplus, property income or transfers), the production boundary or whether an asset is produced or non-produced. But importantly, the valuation principle favoring the “arm’s length” market price is identical to the preferred valuation in national accounts and the discussions about residency, types of ownership, and transfer pricing represent useful real world information for national accounts compilers.

Both tax administrations and national accounts compilers are aiming at correct theoretical results, as taxable income and as GDP and other national accounts aggregates, respectively. Their source data are made up of financial statements, administrative data, contractual arrangements etc. as well as basic statistics. For both types of users these data sources only serve as the point of departure. There is no obligation to accept this information at face value, neither related to the established economic entities, the valuation of reported transactions, or even their very existence. But there are also important differences. The tax administrations may for treaty or other judicial reasons be unable to change or reverse reported transactions, or they may end up in lengthy legal battles. The national accountants are not constrained by such formalities. They can decide to adjust or ignore reported transaction without involving the enterprises.

For tax administrations the question of residency is of fundamental interest as it determines to which tax jurisdiction the enterprise belongs. In the BEPS terminology Controlled Foreign Companies include, in addition to legal corporate entities, so-called “permanent establishment” (OECD, 2015c) which are taxable entities with a significant economic presence and identifiable physical presence to which profit can be attributed. This may sound very similar to the SNA definition of residency of an enterprise and treatment of branches abroad, but may in practice work out quite differently. Profits attributed to “permanent establishments” is derived on the assumption that the transactions in which it is involved have taken place according to the arm’s length principle. From a national accounts perspective a permanent establishment may have something in common with the notional unit constituting a branch that is resident in the economy of operations in connection with substantial external *construction* activities (more on this in section 5). This resemblance may be taken further by also considering the creation of separate entities abroad in connection with processing and FGP. In particular for a FGP it would seem very likely that the enterprise would have some economic as well as

physical presence in the country where all its products are being manufactured. The creation of such units would change operating surplus into property income.

The criteria of “presence” for an entity is difficult to apply in the case of mobile income such as payments for intellectual property, digital transactions and other services with no physical counterpart. It must be assessed if the entity independently controls which risks it takes over and if it can respond to these risks. Thus risk should not be allocated to an entity that cannot meaningfully control it or does not have the financial capacity. In that case the risk must be (re)allocated to the party that has such control and financial capacity. Legal ownership of intangibles does not confer the right to retain the return from exploiting the intangible. If a legal owner of an intangible runs no risk, compensation should only be paid for administrative costs, if any. The assumptions of risk can significantly affect what is the price at arm’s length. Transactions should not simply be accepted from what is set out in a contract.

To assess transactions in intangibles relative to assumption of risk, and of transfer pricing involving the use and transfers of intangibles *specificity* is considered essential in the BEPS (OECD 2015, par. 6.12). Specificity, as opposed to vaguely specified or undifferentiated aggregates of intangibles, means that all the characteristics of the item dealt with are known, similar to for example the detailed classification applied for manufacturing products or foreign merchandise trade statistics. In national accounts specificity for intangibles is in general absent, as for example illustrated by the fact that patents under the 2008 SNA is no longer a separate category in the system (The 1993 SNA has the category “patented entities” p. 393).

For most categories of intangibles national accounts compilers will have no idea about the specific type of product and therefore valuation at both current and constant prices are based on conventions and without any observed real world counterpart. Nonetheless the unspecified intangibles play a crucial role in determining GDP and economic growth. In the BEPS (OECD 2015b par. 6.79) it is pointed out that compensation to producers of R&D based on costs and modest mark-up will not reflect the anticipated value of, or the arm’s length price for, the contribution of the R&D activity. For tax administrations the question is in which jurisdiction the profit belongs and what the amount should be. In national accounts there are similar problems. With the cost based approach for estimating own-account output of R&D it is implicitly assumed that this production is outsourced to a risk free producer. The next step of deciding the value of the R&D project as high risk gross fixed capital formation is completely absent. This situation is closely related to the lack of knowledge about the specificity of the R&D products. When is a “unit “completed” and which “unit” was sold? National accounts just reflect a bookkeeping exercise and the consumption of fixed capital for the intangibles reflects that enterprises wish to recover costs – which of course they always do. The market value of the intangible will only appear in the system when it is evidenced by an actual transaction, including cases where a MNE transfer such assets to an affiliate abroad. This may happen at an artificial transfer price, but because of the lack of specificity and the non-existence of comparable arm’s length prices, this may never be detected and prices recorded at face value.

For tax administrations the transfer of intangibles between associates without compensation is a problem. In such cases, where compensation should be estimated to avoid misreporting of profit, there will be no items in the accounts from which to start. In national accounts such “missing” transactions will not be detected, but even if they were, the SNA does not prescribe imputations. This problem is closely related to the fact that it will usually not be possible to identify where (by industrial activity or by country) these intangibles are actually used in production. In the case of shared inputs the use may take place simultaneously in several countries. Even in cases where there are actual transactions related to the intangibles this problem does not go away, as international trade statistics for services identify the importing countries as the countries from which payments are made, which are not necessarily the countries in which the production involving the intangible takes place. In BEPS it is further noted that an enterprise do not necessary become the owner of the intangible just by financing the “production” of it. But this is what is now generally assumed in national accounts for lack of specific knowledge.

In the BEPS it is also noted that when the costs of developing intangibles are not capitalized in the business accounts, the intangible will not appear in the balance sheet. Thus the creation of intangibles as well as the transfer of these and the related services between subsidiaries (not evidenced by transactions) of a MNE may go completely unnoticed both in the business accounts and in collected statistics. This underlines the very special position of intangibles: You can’t see them, when they are there, and you can’t see they are missing when they are not there. This reflects the fact that their current return requires almost no physical inputs. It may therefore also be questioned if this is really production in the sense of the SNA, as also noted in (Rassier, 2017).

The BEPS project and other international initiatives on tax avoidance strategies that exploit gaps and mismatches in tax rules to artificially shift profits to low or no-tax locations may hold good promise for the future. However, the deep-digging analytical work and mapping of MNE practices carried out under the project clearly demonstrates that a large share of reported transactions in intangibles must for any foreseeable future be expected to reflect tax minimizing behavior rather than underlying economic realities. To the extent that these transactions are included in the national accounts at face value, and usually there will be no other choice, the accounts will give a distorted picture of the economy as measured by the GDP. When tax administrations cannot solve the problems of residency and valuation related to intangibles, how should the statistical offices be able to do so?

But as noted elsewhere in this paper, even if the ideal world for the tax administrations should someday dawn the huge potential for corporate inversion and for bringing into play now dormant intangible assets would still be a major source for disruptive changes of the GDP. As the tax administrations are primarily concerned with where “profit” arises and not with national accounts distinctions between types of income (operating surplus, property income or transfers) it is for them of no consequence how the income is classified, just it can be verified to reflect commercial rationale economic transactions. In national accounts the classifications of transactions matters a lot. Actual transactions in intangibles cannot just be ignored in the national accounts (contrary to those of the national accountants own

making such as capitalization of artistic and literary originals and of R&D, including the estimates of the own-account output of these, if it was chosen to do so). It is therefore essential to record these transactions as far “down” in the accounting system as possible to avoid their arbitrary and unwarranted influence on the GDP.

5. Experimental estimation of the “Geographical” GDP for Denmark 2005-2017

“Production abroad” is in the context of this paper defined as the identifiable physical production carried out on a contractual basis outside the geographic boundaries of the country in which the principal is resident. According to the now established typology (UN 2015) production abroad consists of “goods sent abroad for processing” (for short: Processing) and the activity of factoryless goods producers (FGP) abroad. As noted elsewhere in this paper the official GDP includes value added earned by “production abroad” by Danish residents, and excludes value added earned by non-residents by production carried out within the Danish geographic boundaries. This has been the case under all versions of the SNA, and was not changed with the 2008 SNA. The 2008 SNA does not elaborate on production abroad, and only deals with the very simple case of processing abroad, where the goods are returned to the country of the principal after the processing has been completed. Therefore the shift to the change of ownership principle for exports and imports of goods with the 2008 SNA was promoted as an uncomplicated change from gross to net recording in the processing case.

In order to derive the GDP generated within the Danish geographic boundaries the production abroad by Danish residents must be deducted, and the production carried out in the Danish geographic territory by non-resident producers added. Construction work abroad (generally with duration of less than one year) is a kind of production abroad for which correction can also be made although it is not usually mentioned together with processing and FGP.

Finally, to eliminate another major source of disturbance to the GDP under increased globalization current payments for R&L related to the use of intangible property rights (charges for the use of intellectual property), for which it is very difficult or impossible to establish their physical presence relative to where production takes place will be reclassified from services to property income (as was the case prior to the 1993 SNA).

The over-all results of these calculations for Denmark for the years 2005 to 2017 are shown in *table 4*. The effects on GDP are shown in steps, first adjusting for production abroad, next for royalties and licenses, and finally for their combined effect. As mentioned in the detailed explanations to the calculations below the data needed are in some cases not available. This is not surprising as official statistics are still in the process of expanding to cover still more sides of globalization. One purpose of this exercise is therefore also to point out which additional data are needed to fully implement the proposed adjustments. In some cases missing data are replaced by estimates, whereas in others, when there is no basis for making estimates, the cells are left empty.

A situation that is often quoted as adding arbitrariness to the GDP is the case where an independent foreign contractor in country A (either in connection with processing or FGP) is acquired to become a subsidiary of the principal in country B. If the new subsidiary is taking over all risks and benefits of the production, including marketing the finished products, the previously earned value added by the principal will be replaced by property income received from the subsidiary, and GDP thus decrease. However, the estimated “geographic” GDP will not be affected, as the value added earned abroad was already previously deducted. The shift from value added to property income in this case should not be mixed up with the effects of reclassifying R&L from services to property income.

Goods sent abroad for processing (Processing)

Under this global production arrangement the domestic principal owns the materials and purchases manufacturing services from a foreign supplier to transform the physical inputs into another product. Over the course of the transformation process, the principal maintains economic ownership of the processed raw materials or semi-manufactured goods as well as the goods after processing. (UN 2015 par. 2.15)

For processing the following five flows are needed to establish the value added earned abroad:

- Goods sold abroad in connection to processing abroad (Output)
- Goods returned after processing abroad without change of ownership (Output)
- Goods procured abroad in connection to processing abroad (IC)
- Goods sent abroad in connection to processing abroad without change of ownership (IC)
- Manufacturing services (IC)

All these flows are available in the BOP statistics and the related tables reconciling balance of payments trade in goods and services and international merchandise trade statistics as recommended in (UN 2012 p.40). This reconciliation table is published with the Danish BOP. The calculations are shown in *table 1*. However, for the corresponding processing by non-resident enterprises in Denmark, only the three of these flows are available in the BOP or the reconciliation table:

- Goods returned abroad after processing in Denmark without change of ownership (Output)
- Goods received in connection to processing in Denmark without change of ownership (IC)
- Manufacturing services (IC)

Thus, whereas it is possible to calculate the GVA generated by Danish resident enterprises in connection with processing abroad, two missing flows (Goods sold in Denmark in connection to processing to processing in Denmark, and Goods procured in Denmark in connection with processing

in Denmark) do not permit calculating the GVA generated in the Danish geographic territory by non-resident enterprises. Basically these two flows are missing because those enterprises able to report this information are outside the Danish statistical jurisdiction. Nevertheless Statistics Denmark is now working to establish the contents of these flows for major contractors, using value added tax information and other alternative sources.

Table 1. Processing abroad and in Denmark

	Million DKK. Current prices	2005	2008	2011	2014	2017
	GVA earned by Danish enterprises by processing abroad:					
Output	Goods sold abroad in connection to processing abroad	1536	10852	27060	43912	63391
Output	Goods returned after processing abroad without change of ownership	2601	2932	2233	2873	2797
	Total output	4137	13784	29293	46785	66188
Input	Goods procured abroad in connection to processing abroad	204	1680	6392	10631	12324
Input	Goods sent abroad in connection to processing abroad without change of ownership	2071	2793	2696	2728	2501
Input	Manufacturing services	784	2059	4139	6867	9118
	Total Intermediate consumption	3059	6532	13227	20226	23943
GVA	GVA earned by Danish enterprises by processing abroad	1078	7252	16066	26559	42245
	GVA/Manufacturing services	1,38	3,52	3,88	3,87	4,63
	GVA earned by foreign residents by processing in Denmark					
Output	Goods sold in Denmark in connection to processing in Denmark	Missing				
Output	Goods returned abroad after processing in Denmark without change of ownership	2349	2065	953	1999	2081
	Total output	Not possible				
Input	Goods procured in Denmark in connection to processing in Denmark	Missing				
Input	Goods received in connection to processing in Denmark without change of ownership	1631	1492	819	2123	3001
Input	Manufacturing services	748	681	333	1423	2017
GVA	Total intermediate consumption	Not possible				
	GVA earned by foreign residents by processing in Denmark					
	Estimated as 4 times Manufacturing services	2992	2724	1332	5692	8068

Source www.statistikbanken.dk/BBUHV and www.statistikbanken.dk/BB2

The so far missing data shows that the shift from the border-crossing principle to the change of ownership principle of the foreign trade statistics is incomplete. Some imports (sales by the non-resident processor principals in Denmark) and some exports (procurements by non-resident processor principals in Denmark) are missing. This may also have implications for the outcome of the balancing of the system of national accounts, and thus for the national accounts aggregates, when the product balances are forced into balance in spite of these inconsistencies. However, this balancing problem was not created by the introduction of the 2008 SNA. It must be assumed to have been even bigger before the (partial) introduction of the change of ownership principle for exports and imports of goods.

The GVA concept established by the above flows may seem to disregard any deliveries of intellectual property related services by the principal. However, the processor will not usually purchase such services from the principal. But even if that were the case, these costs would subsequently be included in the manufacturing services, and thus deducted from the calculated GVA generated abroad. In most cases there will probably be no explicit charge for these services because they are internal to the involved enterprises, much like ancillary services. And in the SNA R&L transactions are only recorded when they are evidenced by actual transactions. They are never imputed no matter how big the underlying assets may be. Therefore it is in general not correct to interpret a high GVA share on the processed goods as a measure of the return on intangible capital. It may for example also reflect the skill to effectively apply cheap labor abroad.

In table 1 the non-residents' GVA generated in connection to processing in Denmark is estimated using the proportions between GVA and manufacturing services for the Danish processing abroad.

Factoryless Goods Producers (FGP)

FGPs are distinguished from principals involved in processing by not being the owners of the raw materials used in the production process abroad. FGP is a principal that controls the outcome of production of a good by undertaking the entrepreneurial steps and providing the technical specifications required to produce the good. The FGP concentrates on innovation and marketing decisions. While the FGP does not supply material inputs into the production process, the FGP does supply substantial service inputs in the form of technology, know-how and product design (although such inputs are not necessarily evidenced by actual transactions). Likewise, the FGP maintains control over the outcome of the production process by providing technical specifications that are essential for the transformation of the material inputs (UN 2015 par. 2.42). In the typology of global production arrangements the activity of FGPs is classified as merchanting. The key features of merchanting are that the traded goods not physically enter the domestic entity's territory while the sales are credited to the domestic entity, and that the physical form of the goods, while owned by the domestic entity, does not change (UN 2015 par.2.32).

In the official BOP compiled according to the BPM6 (IMF 2009) there is no longer a separate category called merchanting. It is included under exports and imports of goods. However, in the recommended table "Reconciling balance of payments trade in goods and services and international merchandise trade statistics" (UN et al. 2012 p.40) the item "Net exports of goods under merchanting" appears. An extended reconciliation table is published with the Danish BOP, also including the gross trade flows under merchanting, as shown in the top part of *table 2*. It is also worth noting that even though merchanting is now included with goods in the BOP, the data collecting scheme has not changed. It is still based on a sample survey with the well-known problems to know the universe and keep the sample up-to-date. Therefore new FGPs may be identified with some delay or even go unobserved.

To assess the FGPs' activities abroad it is necessary to subdivide total merchanting recorded in the BOP into (1) "traditional" merchanting where the domestic entity has no influence on the production of the traded goods, and (2) the FGP as defined above with a contractual involvement in the production of the traded goods. The current recording of merchanting in the BOP does not contain this distinction. But in a supplementary analysis to the Danish BOP, starting with 2005, this subdivision has been implemented on the assumption that trading entities classified in the business register under manufacturing are FGPs, and the rest "traditional" merchants. It is therefore possible to calculate the "trade margin" realized by the FGPs which for the purpose of this paper is taken to be the GVA earned in connection with production abroad as shown in table 2. The fundamental difference between the two kinds of merchanting is underlined by the observed difference in their trade margins. For traditional merchanting the margin rate is around 15 percent, whereas it is around 50 percent for FGPs.

Table 2. Estimating the value added generated by the FGPs.

Million DKK. Current prices	2005	2008	2011	2014	2017
Total merchanting:					
Merchanting, sales abroad	70097	122252	135607	157915	207308
Merchanting, purchases abroad (of goods sold)	-59816	-102788	-107966	-123520	-161958
Merchanting, net	10281	19464	27641	34395	45350
"Trade margin"	17,2	18,9	25,6	27,8	28,0
Merchanting by Manufacturing enterprises (FGP)					
Sales abroad	6194	34843	58772	55245	70395
Purchases abroad	-4236	-25599	-40406	-34894	-46994
Merchanting net (GVA for FGP)	1958	9244	18365	20351	23401
"Trade margin"	46,2	36,1	45,5	58,3	49,8
Residual: "Traditional" merchanting					
Sales abroad	63903	87409	76835	102670	136913
Purchases abroad	-55580	-77189	-67560	-88626	-114964
Merchanting net	8323	10220	9276	14044	21949
"Trade margin"	15,0	13,2	13,7	15,8	19,1

Source: <http://www.statistikbanken.dk/BBUHV> and for the subdivision internal data in Statistics Denmark.

The merchanting revenue generated by "traditional" merchanting (by those enterprises not classified as manufacturers in the business register) is in the context of this paper not considered production abroad, as purchases are not based on contractual arrangements for the production of the traded goods, and the productive resources used will usually be located in the home country of the merchant. The data indicate that traditional merchanting is less affected by globalization.

The subdivision into the two types of merchanting is made on basis of classification by economic activity in the business register rather than on specific knowledge about contractual arrangements. An

entity that has for some time been almost exclusively engaged as FGP may in the business register have been reclassified to wholesale trade following the present international recommendations. If this is the case the entity will also in the BOP analytical table be moved from FGP to traditional merchanting. In the actual figures for 2015 and 2016 (not in the table) the trade margin for traditional merchanting jumped up from the level of 15 percent to around 24 percent, and remained high, at 19 percent in 2017, indicating that this phenomenon may have been at work.

In merchanting the trade margin is obtained as the difference between the sales price and the purchase price for the good in question, and the measured margin will not cover goods that are produced but not yet been sold. But more importantly the definition of merchanting implies that the FGP's sales in the home country of output contracted abroad will not be captured by the BOP statistics on merchanting. Any such imports will be covered by the cross-border trade statistics of the home country, but there are no records in the current merchandise trade statistics connecting this flow to the FGP activity. The required information can most likely be extracted from the import data at enterprise level, but this has so far not been attempted. The good news is the required information is available in enterprises under Danish statistical jurisdiction. If the FGP's imports to the home country were identified, the corresponding purchase values abroad would also have to be reported in order to derive the trade margin.

The trade margin is not formally identically to the GVA generated. The FGPs will have some domestic intermediate consumption related to the activities abroad (administration, management, design and innovation) that are not deducted. However, these costs may be minor, as wage costs are not included, and for intellectual property services evidenced by actual payments the remarks made for processing are also applicable for FGP.

Non-resident FGPs operating in Denmark

Similar to Danish FGPs' activities abroad there must be value added generated by the activities of non-resident FGPs within the Danish boundaries. But it is not easy to identify. It is a peculiar characteristic of merchanting in the BOP that there are only exports and no imports (although of course the value of merchanting is obtained as the difference between exports and imports of goods under merchanting).

As long as foreign trade in goods were based on the border-crossing principle in the SNA and the BOP merchanting would obvious not be captured in connection with trade in goods, but was covered by the statistics on foreign trade in services. With the introduction of the change of ownership principle for exports and imports of goods merchanting ceased in principle to exist as a separate category. However, not to undermine the usefulness of the detailed foreign trade statistics it was decided to treat purchases of merchanted goods as negative exports, and to show purchases and sales of merchanted goods as totals only.

Why is the statistical treatment different (not merchanting but ordinary imports and exports) when the goods are either purchased or sold in the country of the trader, and how is the trade margins taken into account in the foreign trade transactions in these cases? These questions only relate to the recording in the BOP and the need to obtain the data required for the present calculations. The value added earned by resident trading enterprises always, under the 2008 SNA framework, ends up correctly in their country of residence, independent of where in the world the goods are purchased or sold. Therefore also the trade margins earned on goods purchased in the home country and sold abroad, and vice versa, are included.

Now, how will a non-resident FGP's production contracted with an enterprise resident in Denmark (the contractor) be covered in current statistics? To simplify, assume that all the contracted output is sold by the FGP to a customer in a third country. This is merchanting according to the present definition, although most likely with a high trade margin. The FGP will purchase the goods from the contractor for say 100. Following the change of ownership principle this is imports to the home country of the FGP and exports from the country of the contractor; exports and imports prices are identical and equal to 100. In the next step the FGP sells the goods to a customer in a third country for 150. This is exports from the country of the FGP and imports to the third country. Export and import prices are identical equal to 150. Note that even though the good is imported to the country of the FGP according to the change of ownership principle, the FGP is still engaged in merchanting because the good has not physically crossed the borders of his home country.

Following the change of ownership principle the FGP obviously earned the trade margin in his home country, but related to a good that was never physically in the country. Something increased the value of the good (not processing, perhaps adding a trade mark) while it was in his possession. According to the border-crossing principle there is only *one foreign trade transaction*: the good is exported from Denmark to the third country, probably at a fob value of 150. This transaction must be suppressed in the merchandise trade statistics if the above transactions following the change of ownership principle have been recorded correctly in the statistics of both countries. However, in the Danish statistical system there is no indication that this particular cross-border transaction is related to a non-resident FGP, and the first change of ownership transaction (100) is not recorded at all. For this particular product Danish statistics have recorded an output of 100 and an export of 150. For supply and use of the product to balance there should be an import of a trade margin of 50 to Denmark from the country of the FGP, but no such transaction is recorded. In this example Danish exports will be overstated by 50, and, as in the case of processing, discussed above, reflecting an incomplete introduction of the change of ownership principle. Under a consistent use of the change of ownership principle it seems that the trade margin of the merchant will always be obtained directly as included in his selling price (export price), there is no need for a special transaction to connect purchase and selling price. Even if a non-resident trader purchases and sells goods within the same country there will be two sets of foreign trade transactions, and the trade margin will be obtained as part of the selling price (exports fob)

With the presently available statistical sources it is not possible to identify the extent of non-resident FGPs (contractual) activities in Denmark. However, these activities are in general assumed to be quite limited so this omission in the calculations should not significantly affect the over-all results.

Should FGP be statistically treated in the same way as processing?

There are many similarities between FGP and processing. In both cases production takes place according to contractual arrangements that in detail specifies the product, the processes to be applied etc. and the payment to be made to the contractor. In the Guide on global production (UN 2015 par. 2.69-2.100) and also earlier in (Statistics Netherland 2011) and currently in many other fora questions are raised about the logic of treating processing and FGP differently and in particular whether the FGPs should be classified as manufacturers rather than merchants. The difference between (1) the principal having procured and being the owner of the raw materials (processing) and (2) as part of strict contractual arrangements let the contractor purchase the raw materials (FGP) are mainly formal, and do not make these production arrangements fundamentally different. On this background it seems odd that the statistical treatment of the two cases should be so different as to completely exclude the possibility to assess the activity of non-resident FGP in the country of the contractor.

It has been pointed out that the still increasing FGP gradually makes the wholesale trade activity in the national accounts meaningless and at the same time contributes to a misleading picture of shrinking manufacturing activities. A treatment of FGP in parallel to processing will have implications for classification be economic activity, output and intermediate consumption and foreign trade (gross flows replacing trade margins), but not for the value added. A practical consequence of a changed treatment of FGP would probably be that more statistics would be collected.

A solution would thus be to replace the separate categories of processing and FGP with a more general category called “contractual production” and to develop statistics giving a complete picture of these activities. In current statistics the major differences arise because the contractor under a non-resident FGP will report the output (total and by product) in the same way as all other resident producers, but with no information about the contractual arrangements, whereas a contractor under a processing contract will report only the payment for his manufacturing services, with no information about the value or product composition of the output or the raw materials used.

A combined reporting system that to some extent could also include non-resident respondents, for example identified via the VAT system, may be a way forward. For FGPs a separate problem is in which economic activity to classify these enterprises. However, both processing and FGP relate to specific transactions, not the enterprise as a whole. Therefore these activities can in principle belong as secondary activities in any industry, but it would seem logical to classify FGPs as primarily belonging in manufacturing industries. After all their main role is related to production of manufacturing products.

Construction

Construction abroad comprises construction work for non-residents by enterprises resident in the home economy (export) and the goods and services acquired from residents in the contracting economy by those enterprises (import). Construction in the home economy comprises construction work for residents of the home economy by non-resident construction enterprises (import) and the goods and services acquired in the home economy from resident entities by those non-resident enterprises (export). The construction cover the work performed on construction projects and installations by employees of an enterprise in locations outside the economic territory of the enterprise (UN 2012 par. 3.136-37).

To qualify as construction abroad the activities should be of a limited scale. If the external operations of a construction enterprise are substantial enough, they may constitute a branch that will be resident in the economy of operations. A large-scale construction project contracted by a non-resident enterprise that takes a year or more to complete will usually give rise to a branch (not necessary a legal entity), which will then be resident in the contracting economy. In this case a change of ownership will be recorded for goods and services supplied from the home country (even though there may be no actual change of ownership relative to a notional branch) and the economic return for the enterprise will be received as property income. For practical reasons these rules may not be strictly followed. In the Danish BOP residence in the host country is only recognized if a legal unit has been created, even if the construction activity lasts longer than one year (Statistics Denmark 2017, p. 28).

There are many similarities between the treatment of these construction works and “production abroad”, classified as either processing or FGP. Of special interest are the requirements for the creation of a separate resident unit in the host country, as these are statistical creations and not necessarily related to the formation of a legal entity. In addition to the one-year rule introduced to help determine residence, the criteria include such factors as whether or not there are separate sets of accounts maintained, payment of taxes, substantial physical presence, etc. If a similar rule were applied in cases of major activities related to processing and FGP much of the earnings from production abroad would change from value added to property income. Further (UN 2012, par. 3144) notes that: “Construction may also be undertaken in a manner similar to that for manufacturing services on physical inputs owned by others, where the customer provides goods and services to the contractor as inputs into the construction project. In this case, the inputs do not change ownership. The treatment, as for manufacturing services, is to record actual changes of ownership, not physical movements of goods”.

The flows needed to calculate the value added generated by construction abroad by Danish resident construction enterprises are the following:

- Construction abroad (output)
- Goods crossing the border for construction abroad (intermediate consumption)
- Goods purchased abroad for construction abroad (intermediate consumption)

These data are directly available in the current BOP statistics and the related reconciliation table. The same is the case for corresponding three flows for the construction work carried out in Denmark by non-resident construction enterprises. It is therefore possible to calculate both the value added generated by Danish construction enterprises abroad, and the value generated by non-resident construction enterprises within the Danish geographic boundaries. The fact that it is possible to collect all required statistics necessary to fully cover the non-resident construction activity in Denmark holds good promise for the development of similar statistics for ingoing processing and FGP.

Royalties and license fees (R&L)

Prior to the 1993 SNA R&L were treated as property income. R&L are basically the return earned on an underlying intangible asset, and there are usually none or insignificant simultaneous productive activity (understood as use of labor and physical capital) related to the current R&L transactions. When *all* transactions in R&L were reclassified from property income to sales of services with the 1993 SNA, this was partly stirred by the concurrent capitalization of the output of literary or artistic works which thereby were reclassified from non-financial non-produced intangible assets to a produced asset. Assets resulting from R&D remained classified as non-produced in the 1993 SNA, but related R&L were nonetheless also treated as services (1993 SNA, Annex 1, p. 660)

Even when R&D assets were reclassified to produced assets with the 2008 SNA there is still no direct link between the classification of assets and the flows of R&L. Payments for R&L can relate to many kinds of intangible assets that are not even identified in the SNA, such as trademarks, franchising, organization, design etc.⁵ In the case of R&L related to patents, these patents are not necessary results of R&D, and the lack of *specificity* (as accentuated in the BEPS project) means that there are no identifiable links between the intangible assets (even if “produced” in the sense of the SNA) and the current flows of R&L services, outright sales of these assets or “other change in volume” in connection with corporate inversion. This lack of correspondence also reflects the fact that the values of produced intangible assets (mainly as own-account output) are based on conventions and assumptions of the national accountants own making, whereas the R&L and all other transactions related to intangible assets in national accounts are *observed* transactions. There are no imputed R&L for using own intangible assets in the SNA. The actual R&L transactions in the system are of a somewhat random nature compared to the underlying assets and related productive activities, but may nonetheless significantly affect the value added of individual economic activities and the total GDP.

⁵ In (UN 2012, par. 3.219) it is mentioned that: “Franchise fees, trademark revenue, payments for use of brand names, etc., include aspects of property income (namely, by putting a non-financial, non-produced asset at the disposal of another unit) as well as aspects of services (such as the active processes of technical support, product research, marketing and quality control). In principle, it would be desirable to separate the income and service elements. However, it may not generally be feasible to do so, in which case, a convention is adopted according to which the entire values are to be classified as charges for the use of intellectual property. Such a convention would be taken as a starting point, but if additional information to make a split is available, the compiler should do so”.

Capitalization of intangibles in *business accounts* may be quite different from what is capitalized in the national accounts, both concerning type of asset and valuation. As explained elsewhere in the paper the intangible property rights that have already been “capitalized” by the enterprises and probably giving rise to R&L classified as services under the current SNA framework are most likely only a small fraction of the assets that has not yet been activated in the business accounts. These huge amounts (the magnitude to be compared with the net worth of all NMEs world-wide) that have not yet been activated but with short notice can be so, represents a vast potential to disrupt major aggregates in the national accounts, and in particular the GDP. These risks are exacerbated with the increasing tendency to corporate inversion.

All required data on R&L are readily available both in the national accounts product balances (and in the BOP, though not used directly in the present estimates) and it is straightforward to remove these transactions from the production system. All output and all intermediate consumption of R&L by market producers have been removed. R&L used for intermediate consumption by non-market producers or directly for final uses has been retained in this macro estimate, as the value added of non-market producers does not depend on their intermediate consumption. Corresponding to the change of value added calculated for the production side, there will be decreases for government and household consumption expenditures and exports and imports on the expenditure side. Depending on the foreign trade balance of R&L this may result in either a decrease or an increase in the adjusted GDP. The removal of output of R&L does not affect the valuation of the output of all other products, no matter whether R&L were used in their production or not.

Table 3 illustrates the available subdivisions of charges for the use of intellectual property and for R&D related services in the BOP, although these data have not been used directly in the calculations which are made exclusively from the production side. However, if the R&L used for intermediate consumption by non-market producers or directly for final uses are insignificant the macro adjustment to GDP for R&L could be made using only the BOP data (though this would exclude subdivision by economic activity). The same would be the case if it was decided to *retain as services* the categories of R&L that mostly are used as input by non-market producers or directly for final consumption.

It may be noted that the reclassification of R&L from services to property income will to some extent solve the problems with “special purpose entities” abroad which in the current SNA framework are institutional units. They can be involved in considerable transactions related to intangibles even though they may not qualify as producers according to the general SNA definition (Rassier 2017).

The above calculations only include the charges for current use (and corresponding output) of intellectual property (in the Danish BOP text named royalties and licenses). For practical reasons the present calculations exclude software licenses, as these are merged with other software services in the product balances and thus remain as services in the “geographic” GDP. It may be considered to also let “Licenses to reproduce and/or distribute audio-visual and related products” be exempted from the

reclassification to property income, as these transactions in the same way as software licenses display some characteristics of services, and are being sold on a current basis to a large number of customers.

Table 3. Charges for the use of intellectual property, and trade in R&D related services in the Danish balance of payments.

Million DKK	Exports		Imports	
	2005	2017	2005	2017
CHARGES FOR THE USE OF INTELLECTUAL PROPERTY N.I.E.	7581	25784	5358	10046
Franchises and trademarks licensing fees	2432	8457	1525	4159
Licenses for the use of outcomes of research and development	4409	14142	844	1360
Licenses to reproduce and/or distribute computer software	33	2409	1511	3143
Licenses to reproduce and/or distribute audio-visual and related products	707	776	1477	1383
R&D RELATED SERVICES	15847	25140	9896	30597
Research and development services	5789	8765	3391	11158
Work undertaken on a systematic basis to increase the stock of knowledge	4270	7610	3115	8282
Provision of customised and non-customised R&D services	4270	6608	3115	7914
Sale of proprietary rights arising from R&D	0	1002	0	367
Other research and development services	1518	1155	275	2876

Source: www.statistikbanken.dk/UHTP

The R&D related services in the BOP include only the outright sales of patents, copyrights relating to the results of research and development and industrial processes and designs etc. (UN 2012, par. 3.216). These transactions must therefore be assumed to be largely confined to the expenditure side of the national accounts. Sale of an asset to a non-resident would be recorded as exports and negative gross fixed capital formation for produced assets and as other change in volume for non-produced assets. As the present calculations are limited to deriving the “geographic” GDP from the production side the corresponding expenditure side adjustments are not worked out. Most of the transactions under the heading R&D related services should probably remain as services, as they represent current trade in items that are clearly the result of current productive activity, and have probably always been treated as services in the national accounts. These matters have to be considered in a fully worked out system, including also the expenditure side.

In a more far-reaching approach the capitalization of literary and artistic works and of R&D may also have to be considered⁶. Whereas the methods generally applied for estimating the own-account output of these services safeguard against big variations from one year to the next of the imputed output,

⁶ The questions of R&L as property income rather than services, and the treatment of literary and artistic works and of R&D as produced or non-produced assets do not imply any limitations in their role in production functions and for example in calculations of total factor productivities. On the other hand the increasing tendency to capitalize creation and possession of knowledge may threaten to undermine the national accounts on its own, and even more in combination with the increasing globalization. See for a discussion of this (Lynch and Thage 2017)

major changes to the intangible capital stock can take place via foreign trade or other changes in volume in connection with corporate inversion, and thus affect the consumption of fixed capital. However, both capital stocks (based the perpetual inventory method) and consumption of fixed capital in the national accounts are basically data of the national accountants own making and may hardly qualify as official statistics. And the estimated consumption of fixed capital for intangibles is in particular of an abstract nature. How actual transactions affects these imputed categories may therefore be of less concern, and the estimate of a “geographic” Net Domestic Product anyway out of question.

Comment on the results in table 4:

In *table 4* the results for the “geographic” GDP are shown in two steps. First the effects of the “production abroad” (processing, FGP and construction) are shown, next the separate effects of eliminating Royalties and Licenses, and finally the combined effects on GDP. Except for special developments in 2017 the picture is a rather smooth one showing that the “Geographic” GDP increases at a slower pace than the official GDP. This reflects that production abroad accounts for an increasing share of official GDP, going up from almost nothing in 2005 to around 3 percent at the end of the period. Whereas the expectation is that Denmark as a high wage country will have much more “outward” than “inward” production abroad, there is no similar a priori expectation to the net development of royalties and licenses, but over the years they have also contributed to the increasing difference between the two GDP concepts.

The developments from 2016 to 2017 show a special picture. First the separate effect of the big increase in R&L (discussed in section 2 of the paper) makes the “Geographic” GDP increase 0.44 percentage points less than the official GDP. However, the separate effects of “production abroad” go the other way with 0.92 percentage points, making exceptionally the net result a faster increase in the “Geographic” GDP than in the official GDP. The main reason for this result is the major change in the net position of construction abroad between the two years.

Even though all figures in *table 4* are at current prices, the calculated differences in growth rates can also be interpreted as differences in real growth rates when it is assumed that the GDP deflator is the same for the two GDP concepts. Finally it may be mentioned that even though the present calculations are made for total GDP only, the source data are already, or can be, classified by economic activity, so that similar adjustments can be made at the level of individual economic activities

In general the differences in growth rates between the two GDP concepts may seem small. However, in a period with real growth rates of GDP moving around 1-2 percent, it is not insignificant if the growth rate is 0.5 percent more or less.

Table 4. Estimate of "Geographic" GDP, including corrections for Royalties and Licenses. Denmark 2005-17

Million DKK. Current prices	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015p	2016p	2017p
Total official GDP	1585984	1682260	1738845	1801470	1722143	1810926	1846854	1895002	1929677	1981165	2027108	2065962	2149613
Growth rate, official GDP		6,07	3,36	3,60	-4,40	5,16	1,98	2,61	1,83	2,67	2,32	1,92	4,05
Processing:													
Danish processing abroad	1078	1410	1300	7252	8681	17193	16066	17320	18626	26559	30531	40112	42245
Foreign processing in Denmark (estimated)	2992	2800	2300	2724	1548	1684	1332	2316	3172	5692	8160	7712	8068
Processing net	-1914	-1390	-1000	4528	7133	15509	14734	15004	15454	20867	22371	32400	34177
Construction:													
Danish construction abroad	6712	6721	10242	13436	11628	11520	11669	2695	6665	9864	20543	19238	15694
Foreign construction in Denmark	5153	5997	7587	10621	10147	9083	7296	4080	5661	6592	10291	10163	20708
Construction, net	1559	724	2655	2815	1481	2437	4373	-1385	1004	3272	10252	9075	-5014
FGP abroad (subgroup of merchandising)	1958	3594	5534	9244	15237	18517	18365	20363	21755	20351	21994	26672	23401
Foreign FGP in Denmark (no data)													
Total adjustment, before royalties and licenses	-1603	-2928	-7189	-16587	-23851	-36463	-37472	-33982	-38213	-44490	-54617	-68147	-52564
Adjusted GDP, before royalties and licenses	1584381	1679332	1731656	1784883	1698292	1774463	1809382	1861020	1891464	1936675	1972491	1997815	2097049
Adjusted GDP as percent of official	99,90	99,83	99,59	99,08	98,62	97,99	97,97	98,21	98,02	97,75	97,31	96,70	97,55
Growth rate. Adjusted GDP		5,99	3,12	3,07	-4,85	4,49	1,97	2,85	1,64	2,39	1,85	1,28	4,97
Change in growth rates		-0,08	-0,25	-0,53	-0,45	-0,67	-0,02	0,25	-0,19	-0,28	-0,47	-0,63	0,92
Royalties and Licenses													
Total output of Royalties and Licenses:	11662	12562	13045	21562	24371	17785	18171	22012	18499	21745	22000	23000	33000
Input of Royalties and Licenses in market producers	11340	11159	12844	19124	19271	15756	15038	14718	11540	12854	13000	13500	14000
GVA from royalties and licenses (2015-17 preliminary)	322	1403	201	2438	5099	2029	3134	7294	6959	8891	9000	9500	19000
Adjustments, only for Royalties and Licenses	-322	-1403	-201	-2438	-5099	-2029	-3134	-7294	-6959	-8891	-9000	-9500	-19000
Adjusted GDP, only for royalties and licenses	1585662	1680857	1738644	1799032	1717044	1808897	1843720	1887708	1922718	1972274	2018108	2056462	2130613
Adjusted GDP as percent of official	99,98	99,92	99,99	99,86	99,70	99,89	99,83	99,62	99,64	99,55	99,56	99,54	99,12
Growth rate. Adjusted GDP		6,00	3,44	3,47	-4,56	5,35	1,93	2,39	1,85	2,58	2,32	1,90	3,61
Change in growth rates		-0,07	0,07	-0,13	-0,15	0,19	-0,06	-0,22	0,02	-0,09	0,00	-0,02	-0,44
All adjustments: (Geographic GDP)													
Adjusted GDP, all adjustments	1584059	1677928	1731455	1782445	1693193	1772434	1806248	1853726	1884505	1927784	1963491	1988315	2078049
Adjusted GDP as percent of official	99,88	99,74	99,58	98,94	98,32	97,87	97,80	97,82	97,66	97,31	96,86	96,24	96,67
Growth rate. Adjusted GDP		5,93	3,19	2,94	-5,01	4,68	1,91	2,63	1,66	2,30	1,85	1,26	4,51
Change in growth rates		-0,14	-0,17	-0,66	-0,60	-0,48	-0,08	0,02	-0,17	-0,37	-0,47	-0,65	0,46

Sources: For processing and FGP tables 1 and 2. For construction www.statistikbanken.dk/UHTP and www.statistikbanken.dk/BBUHV. For royalties and licenses. Internal product balances in the national accounts.

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