Thirty-First Meeting of the
IMF Committee on Balance of Payments Statistics

Washington, D.C.
October 24–26, 2018

BOPCOM—18/22
For information

Measurement Challenges Associated to Trade in Intellectual Property Products in the European Union

Prepared by the Eurostat

EUROPEAN COMMISSION
EUROSTAT

Directorate C: Macro-economic statistics
Unit C-5: Integrated Global Accounts and Balance of Payments

THIRTY-FIRST MEETING OF THE IMF COMMITTEE

ON BALANCE OF PAYMENTS STATISTICS

Measurement Challenges Associated to Trade in Intellectual Property Products in the European Union

Washington
October 24–26, 2018

Abstract

Drawing upon the official statistics provided by Eurostat, the paper analyses the magnitude and growth in time of EU international trade in IPP-related services, highlighting the existing asymmetries within the intra-EU region and pointing to measurement issues underlying these data. The paper highlights two aspects, in particular: (i) the important role played by tax minimization and profit shifting strategies of MNEs, most notable in the case of Ireland and the Netherlands, and related current initiatives undertaken by the EU community (e.g., implementation of BEPS Article 13) to address the issue; and (ii) major findings from a stocktaking survey by EU/OECD on data sources and methods to estimate the output of IPP-related services.

1. Introduction

Intellectual property products (IPPs) are the results of research and development, mineral exploration and evaluation, computer software and databases, and entertainment, literary or artistic originals and other intellectual property products[1]. While ESA 1995 treated the expenditures on research and development (R&D) as intermediate inputs, ESA 2010 (like 2008 SNA) recognises them as capital formation leading to intellectual property assets. The inclusion of R&D as a capital asset represents the largest change due to the implementation of the ESA 2010 on GDP levels for the Member States of the European Union (EU).

Economic globalisation has led to a substantial increase in international trade in, and use of, IPPs across the world. However, the intangible nature of IPPs makes data on IPP related international trade flows usually difficult to obtain. Flows between unaffiliated enterprises may not always be identifiable as specific IPP related transactions; the related flows may not be recorded in customs data as well. For transactions between affiliated enterprises the same difficulties arise but even where flows are recorded, they may not be at market prices or follow the arm's length principle. Moreover, tax planning of MNE groups seriously distorts the measurement of IPP related flows. This might have an impact on the recording of the underlying transactions as services in the current account or as property income in the primary income account. Additionally, the establishment of the economic ownership of IPPs, in particular inside multinational enterprise groups, is not straightforward and needs careful investigation to decide which entity in which country is the actual economic owner of the IPP in question.

The paper analyses EU international trade in IPP-related services using the data available in Eurostat's database. It also describes the key distortions caused by tax management of MNE groups and puts forward some proposals to get a better grip on the quality of the data.

2. Definitions and Classification

The measurement of international flows in connection with IPPs has been revised in the sixth edition of the Balance of Payments and International Investment Position Manual (BPM6) and the Manual on Statistics of International Trade in Services 2010 (MSITS 2010). The main relevant variables in BPM6 in measuring international transfers relating to IPPs are:

- ***Charges for the use of intellectual property n.i.e.***
- ***Research and development services***, a sub-item of Other business services, and

[1] ESA 2010, annex 7.1, p. 183; 2008 SNA p. 205ff, §10.98ff

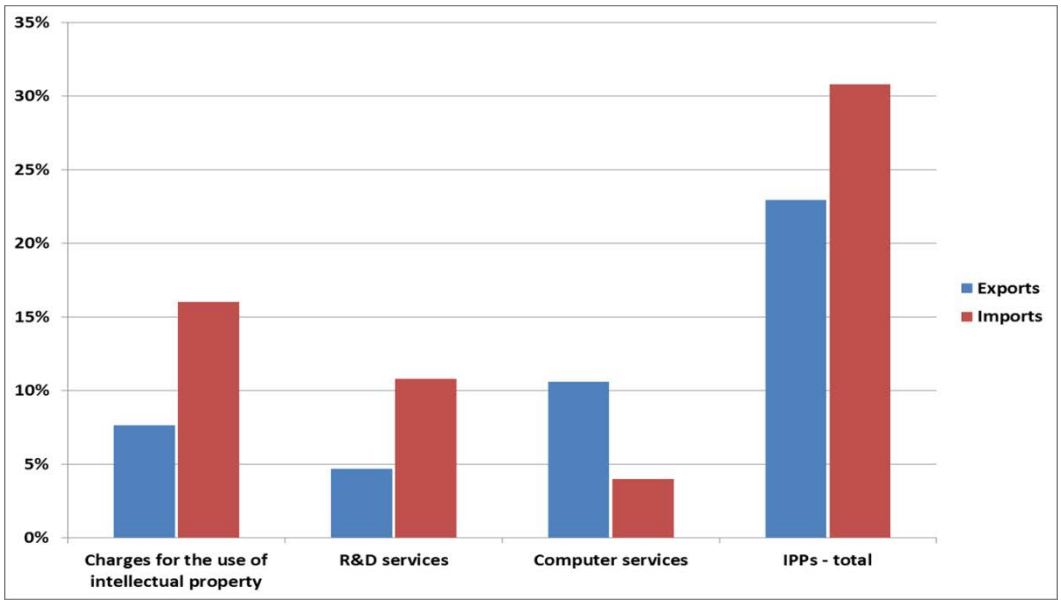
- ***Computer services***, a sub-item of Telecommunications, computer, and information services.

Temporary rights to use patents, copyrights relating to the results of research and development, originals, and industrial processes and designs are included in ***Charges for the use of intellectual property n.i.e.*** In contrast, outright sales and purchases of these items are included under ***Research and development services***. ***Computer services*** consist of hardware- and software-related services and data-processing services; including development, production, supply, and documentation, sales of software and related licenses to use. Consequently, license fees for reproducing or distributing software are included in Charges for the use of intellectual property and not in computer services. However, outright sales of patents and trademarks (non-produced, non-financial assets), when recorded in capital account, are not covered in this study.

3. International Trade in services related to Intellectual Property Products

Trade in intellectual property products plays an important role in the EU's trade in services. In 2016, the EU trade in all IPP related services (composing of the items *Charges for the use of intellectual property n.i.e.*, *Research and development services* and *Computer services*) amounted to €193.7 billion of exports and €219.3 billion of imports to countries outside the Union. This corresponds to 22.9% and 30.8% of the total EU exports and imports in services respectively. The respective shares of individual IPP items are shown in Figure 1.

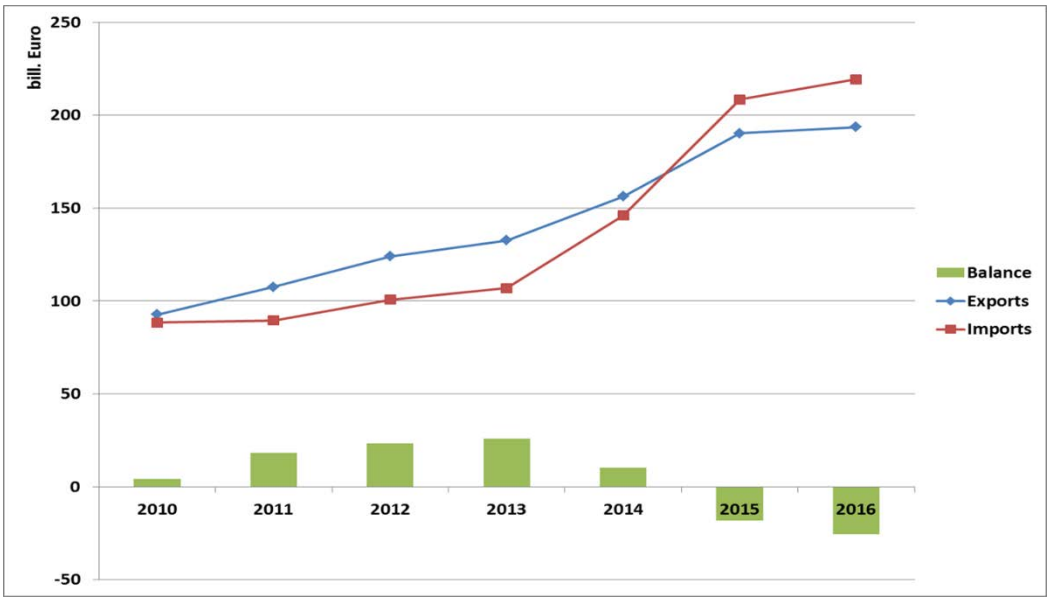
Figure 1: Share of IPPs in EU total trade in services with extra-EU countries, 2016



Source: Eurostat databases:bop_its6_det and bop_eu6_q

Both EU exports and imports of IPP related services increased at a faster rate in 2014 and 2015 than in earlier years. Exports grew by 17.2% and 13.4% in 2014 and 2015 respectively. Imports increased by a much higher rate: 30.7% in 2014, followed by 28.6% in 2015. The growth came down to a more moderate rate in 2016. Although the EU has an overall surplus in services in its trade with extra-EU countries, in the area of IPPs, in 2016, the EU recorded a deficit of €25.6 billion.

Figure 2: IPP related services, EU-28 trade with extra-EU countries (in billion €)



Source: Eurostat databases: bop_its6_det and bop_eu6_q

Intra-EU trade, i.e. trade between EU Member States, is also substantial. In 2016, Member States exported IPP-related services worth €177.6 billion to other Member States, which corresponds to 16.8% of total intra-EU services exports. In the same year, the intra-EU imports in IPPs amounted to €160.7 billion (16.5% of total Intra-EU imports in services). This difference between the intra-EU exports and imports illustrates the high degree of asymmetry and reveals considerable quality problems in the data. The asymmetry is the biggest in computer services, where intra-EU imports are about half of intra-EU exports.

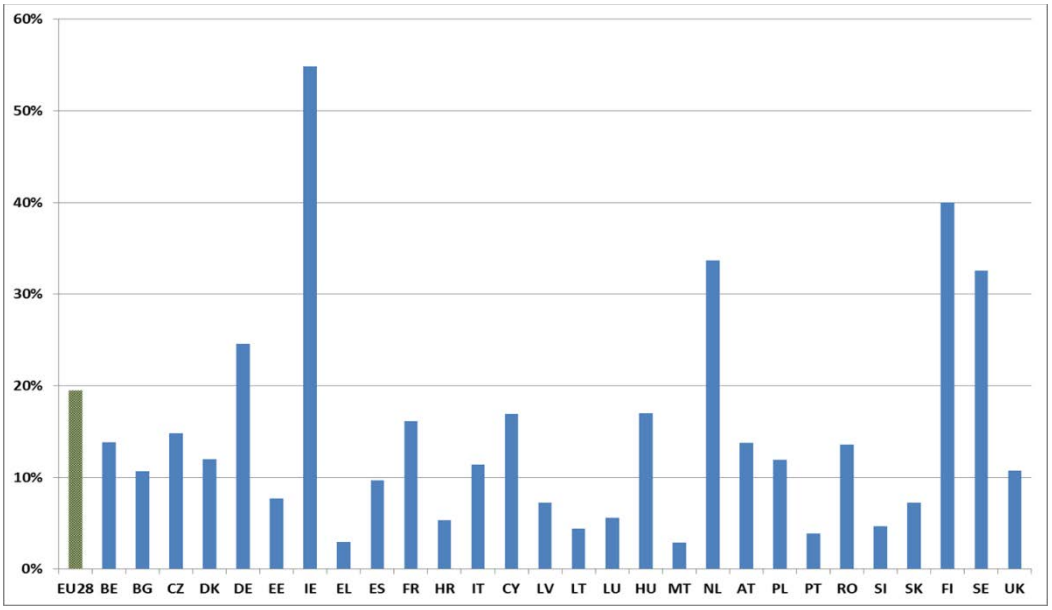
Table 1: Intra-EU trade in IPPs (in billion Euro), and asymmetries, 2015

	Charges for the use of IPP	R&D services	Computer services	IPPs total
Exports	53.207	29.269	95.080	177.557
Imports	65.469	39.291	55.945	160.705
Asymmetry (in bill. Euro)	-12.262	-10.021	39.136	16.852
Asymmetry (in %)	-23,0	-34,2	41,2	9,5

Source: Eurostat databases: bop_its6_det and bop_eu6_q

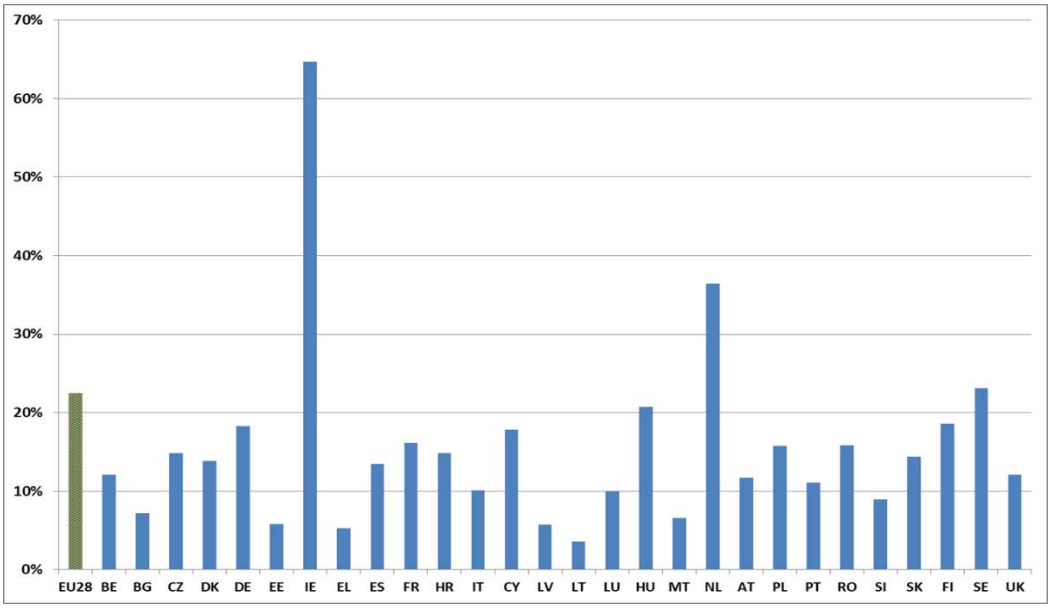
When Member States' trade in services vis-à-vis rest of the world (i.e. intra-EU and extra-EU trade) is considered, in 2016 IPP-related services accounted for 19.5% of exports and 22.5% of imports (see Figure 3 and 4 below). One can see that exports of IPP-related services play a much bigger role in Ireland, the Netherlands and also Finland; in all other countries (except Sweden and Germany) the significance of this service category was below the EU average. The same is true for the imports. While on average IPP-related services account for 22.5% of all service imports, the shares in Ireland (64.7%) and the Netherlands (36.4%) are much higher.

Figure 3: Share of IPP related services in exports of all services (in percent) by Member States vis-à-vis rest of the world, 2016



Source: Eurostat databases: bop_its6_det and bop_eu6_q

Figure 4: Share of IPP related services in imports of all services (in percent) by Member States vis-à-vis rest of the world, 2016



Source: Eurostat databases: bop_its6_det and bop_eu6_q

There are, however, some clear differences between the three categories of IPP-related services in terms of their trading pattern.

In 2016, *Charges for the use of intellectual property n.i.e.*, accounted for 7.7% and 16.0% of EU exports and imports of all services to and from third countries. The EU has a considerable deficit in this service category. The USA is the main trading partner, both for exports and imports. A large part of the increased exports in 2014 and 2015 went to the USA; on the other

hand, increases in imports in these two years originated mostly from offshore financial centres. Among the EU Member States, the Netherlands and Ireland are the two major actors. Ireland is, by far, the biggest importer in this category. The Netherlands is, on the other hand the biggest exporter. Almost 80% of Dutch intra-EU exports go to Ireland. The Netherlands are also the second biggest importer.

Research and development services accounted for 4.7% of EU's total exports in services and 10.8% of its total imports in services. The EU usually has a deficit in its trade with third countries in this category of services. The USA is the biggest trading partner in this category too. Germany is by far the biggest exporter. On the other hand, Ireland is the biggest importer. In 2016, Ireland alone accounted for 98% of the increase in EU imports from extra-EU countries.

Unlike the two service categories described above, in *computer services* the EU records considerable surpluses in its trade with third countries. Their share in the EU's total exports and imports in services amounts to 10.6% and 4.0% respectively. The USA and offshore financial centres are the main trading partners. Trade in computer services between Member States is higher than trade with third countries. Among all Member States, Ireland is the biggest exporter of computer services.

A more detailed description of the EU trade in these three service categories is given in the Annex.

The above-mentioned findings justify a closer look at Ireland and the Netherlands. It has to be mentioned that considerable asymmetries in intra-EU trade, as shown in Table 1, raise questions about the quality and reliability of the available data. Trade in services is by definition harder to measure than trade in goods. This applies even more strongly for IPP related trade. The relation between company size and output/export (or intermediate consumption/import) for instance is less obvious than in the case of other services (or goods). Moreover, many of the transactions take place between affiliates of the same multinational enterprises, which means that the prices concerned are not necessarily according to market values. In addition to this, for many multinational enterprises both Ireland and the Netherlands play a role in their global tax management. All of these distortions create considerable challenges for national statistical authorities in properly measuring IPP related transactions.

4. Distortion in IPP data caused by MNEs' tax management

The description of the EU trade in IPP related services in section 3 and in the Annex is based on official statistics, which are compiled by the Member States and disseminated by Eurostat in its database. However, recently several studies have revealed that available data on cross-border payments for IPP are distorted by various factors. The size of the asymmetries is illustrated in Table 1. The key distortions are caused by:

- Incomplete reporting, incomplete surveying and difficulties in separating technology flows. The discrepancy between total intra-EU exports and imports shown in Table 1 indicates a statistical quality problem.

- In addition, many countries, which are home to many MNE affiliates with IP holding structures, do not report royalty receipts.
- The statistical community is also facing problems arising from MNEs using IP assets as vehicles for tax planning. The goal of such tax planning is to shift revenue to units within the MNE structure that are tax resident in low tax jurisdictions and therefore minimise the global tax liability of the MNE. The previous section showed the dominant role played by Ireland and the Netherlands in the IPP related transactions. In both cases, it is known that the strong presence of foreign affiliates and related intra-firm transactions play a role. The intangibility of IP assets leads to such constructions, as they can be easily located and relocated around the world at little cost. De Haan M. and Haynes J. (2018) in their paper illustrate this issue with two real life examples of Google and Nike using information obtained from public sources[2]. The so-called "double Irish Dutch sandwich" structure has been used by Google, Apple and others in order to shift income from an Irish or Dutch operating subsidiary into a holding company located in a zero-tax jurisdiction, while also avoiding inclusions to the U.S. parent that might result from outbound intellectual property transfers [3]. Moreover, Tørsløv T, Wier L. and Zucman G (2018) explore in their publication how much profits move across borders today because of differences in corporate income tax rates[4]

International initiatives to address tax base erosion and profit shifting refer to corporate tax planning strategies used by multinational companies that artificially "shift" profits from higher-tax locations, to lower-tax locations, thus "eroding" the tax-base of the higher-tax locations. The recent G20/OECD Base Erosion and Profit Shifting Project (BEPS), aims at restoring confidence in the system and ensuring that profits are taxed where economic activities take place and value is created. The implementation of BEPS Action 13 means that MNEs with more than 750 million USD in revenues are legally required to provide country-by-country information on several key variables to the tax office of their headquarter country, including e.g. revenues, employment, profit and taxes.

Based on this, the EU has adopted a Council Directive (Council Directive (EU) 2016/881 of 25 May 2016), which requires MNE groups located in the EU with total consolidated revenue equal or higher than 750 million Euro, to file a country-by-country report in the Member State in which the ultimate parent entity of the MNE group or any other reporting entity is resident for tax purposes. According to Article 8aa, the Member State must communicate the report to any other Member States in which one or more constituent entities of the MNE Group are either resident for tax purposes, or are subject to tax with respect to the business carried out through a permanent establishment. The report will include information for every tax jurisdiction in which the MNE group does business on the amount of revenue: profit before income tax,

[2] Mark de Haan and Joseph Haynes (2018): R&D capitalisation: where did we go wrong? Economic Commission for Europe Conference of European Statisticians Group of Experts on National Accounts Seventeenth session Geneva, 22-25 May 2018

[3] For details see, J. Brothers (2014): From the Double Irish to the Bermuda Triangle, Tax Analysis; and Neubig T., Wunsch-Vincent S. (2017): A missing link in the analysis of global value chains: cross-border flows of intangible assets, taxation and related measurement implications, Economic Research Working Paper No. 37, WIPO, Geneva

[4] http://www.nber.org/papers/w24701.pdf

income tax paid and accrued, number of employees, stated capital, retained earnings and tangible assets. Starting from 2017, the report has to be filed on an annual basis, no later than 12 months after the last day of the reporting fiscal year of the MNE group. However, the first exchanges concerning 2016 had to take place by 30 June 2018.

Public disclosure of such information is currently not foreseen, however, this proposal does not preclude that the European Commission decides in the future to propose imposing public disclosure obligations on companies. Whether this will happen in the future depends on the outcome of the Impact Assessment of public Country-by-Country Reporting. One may hope that this directive becomes beneficial not only for government finances but also for official statistics. The National Statistical Institutes are encouraged to discuss with their tax authorities to explore the possibility of having privileged access to the data.

It should be mentioned that from 2015 onwards Irish tax legislation does not allow companies to use the 'Double Irish Dutch Sandwich' structure for new tax plans, by preventing an Irish company from being tax resident elsewhere. Existing plans can be continued until 2020.

5. Eurostat/OECD Task Force on land and other non-financial assets

Because of the importance of comprehensive balance sheet information for economies and for their main institutional sectors Eurostat and the OECD decided to launch a joint task force in 2012 to provide guidance on the compilation of various types of non-financial assets. In the second half of 2017, the mandate of the task force was extended to focus on guidance for the measurement of intellectual property products (IPPs). The main objectives of the Task Force are to develop further the practical guidance for estimating stocks and flows of IPP, in particular R&D and Software, and to assess how economic ownership of IPP should be determined, especially if the IPP is located within a MNE.

The Task Force carried out a stocktaking survey focusing on data sources and methods used by EU/OECD Member States.

The main results in the area of R&D were:

- Practically all countries follow Frascati Manual[5] as main source to estimate output and GFCF
- Few countries use UNECE Guide to Measuring Global Production to determine ownership
- Input approach is used to measure price, some countries use productivity adjustment
- Service lives of R&D assets differ across industries, but mostly around 10 years

In the area of software the most important outcomes were:

- There are no common data source in the EU/OECD Member States
- Estimates for own-account software are usually based on time spent by programmers; different occupations are used

5 http://www.oecd.org/sti/inno/frascatimanualproposedstandardpracticeforsurveysonresearchandexperimentaldevelopment6thedition.htm

- There are difficulties in determining intermediate consumption vs capital formation (no data sources)
- Few countries separately estimate databases
- Quality adjustment for software deflators is applied
- Service lives of software differ, but mostly around 5 years.

The main findings concerning economic ownership were:

- Countries apply different approaches to determine ownership of R&D output depending on availability of underlying information
- Many countries cannot separately identify transactions or transfers of IPP between affiliated enterprises
- In the field of R&D there are differences between Frascati data on cross-border funding and BOP data
- Major difficulties exist in determining ownership of assets within MNE groups.

The report of the Task Force is due by the end of 2018. The report will give guidelines about the measurement of R&D and computer software. The report will also describe merits and drawbacks of the different possible approaches to establish economic ownership of IPPs.

6. Concluding remarks

The paper gives a broad overview of IPP related trade in services of the EU Member States. Available official statistics show clearly the dominant role played by Ireland and the Netherlands in this respect.

However, the paper also draws attention to the deficiency in quality of data because of various reasons, like difficulties in identifying IPP-related transactions, tax minimisation and profit shifting strategies of MNEs, etc. A number of large MNEs have used the so-called “double Irish Dutch sandwich”, or similar structures, to shift income from high tax territories to holding companies located in low-tax jurisdiction. Consequently, the compilers are confronted with the fact that cross-border payment data does not accurately reflect where the IPP originates from and where it is used.

Increased collaboration between national statistical offices, national tax administrations, businesses and academic researchers is needed to continue improvements of the national statistics' measures of cross-border IPP flows. Where possible, linking tax return data at the firm level with financial statements would provide important insights.

Recent international and national tax initiatives initiated by the OECD aiming at taxing the profit where economic activities take place and value is created should result in reduction of profit shifting in the future. It would be desirable to make the information from the country-by-country reporting, as stipulated by the BEPS Action 13 and the Council Directive (EU) 2016/881, available to national statistical institutes for statistical purposes. This could improve the data quality and lead to statistics that are more reliable.

Annex

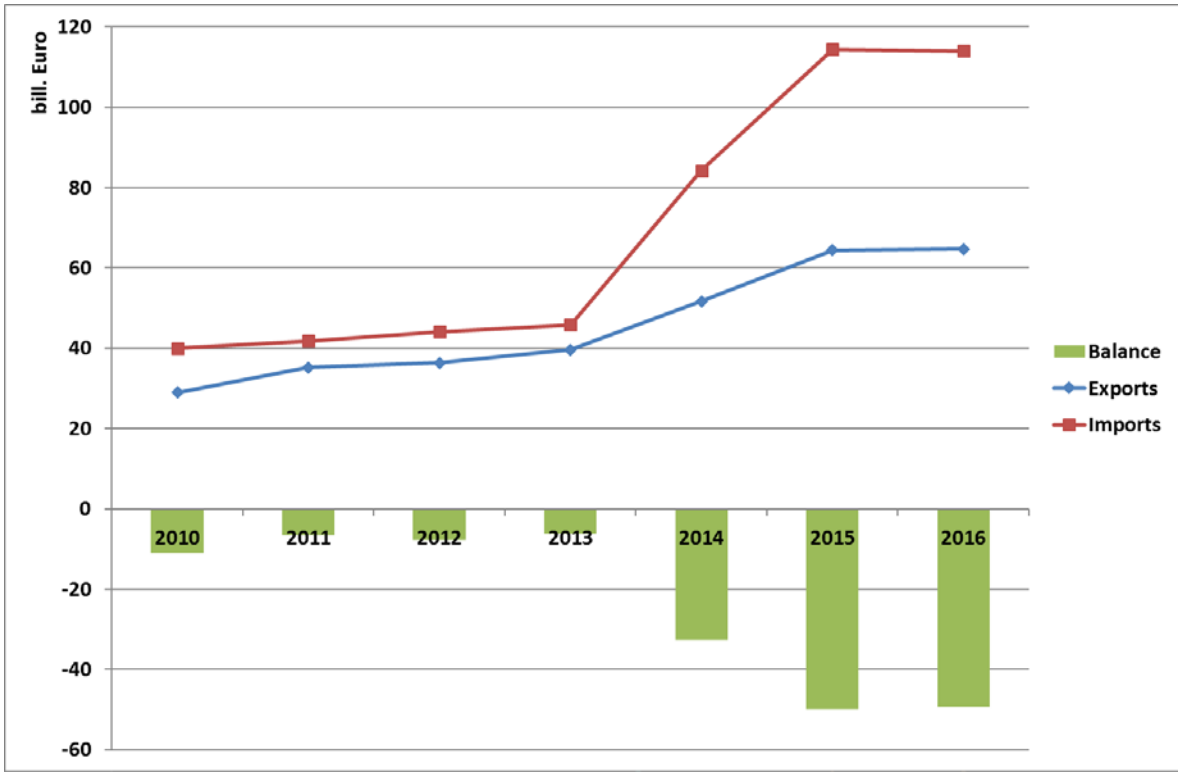
In the following 3 sections the components of the IPP related services, i.e. *Charges for the use of intellectual property n.i.e.*, *Research and development services*, and *Computer services* have been analysed separately.

Charges for the use of intellectual property n.i.e.

Charges for the use of intellectual property n.i.e., is one of the main variables in measuring international transfer of knowledge and technology. In 2016, this service category accounted for 7.7% and 16.0% of EU exports and imports of all services to and from third countries.

During the years 2010-2013, the exports of the EU vis-à-vis extra-EU increased moderately from €29.0 billion to €39.6 billion. The imports increased in the same manner from €40.0 billion in 2010 to €45.8 billion in 2013. The years 2014 and 2015, however, saw higher increases in exports accompanied by much higher increases in imports. While EU exports in 2014 and 2015 increased by 30% and 25% respectively, the imports grew by 84% and 36%, leading to a five-times increase in deficit in 2014 compared to 2013 and an even higher deficit in 2015. In 2016 both exports and imports stabilised at the high level of 2015 (see Figure A).

Figure A: Charges for the use of intellectual property n.i.e., EU-28 trade (in billion €) vis-à-vis extra-EU

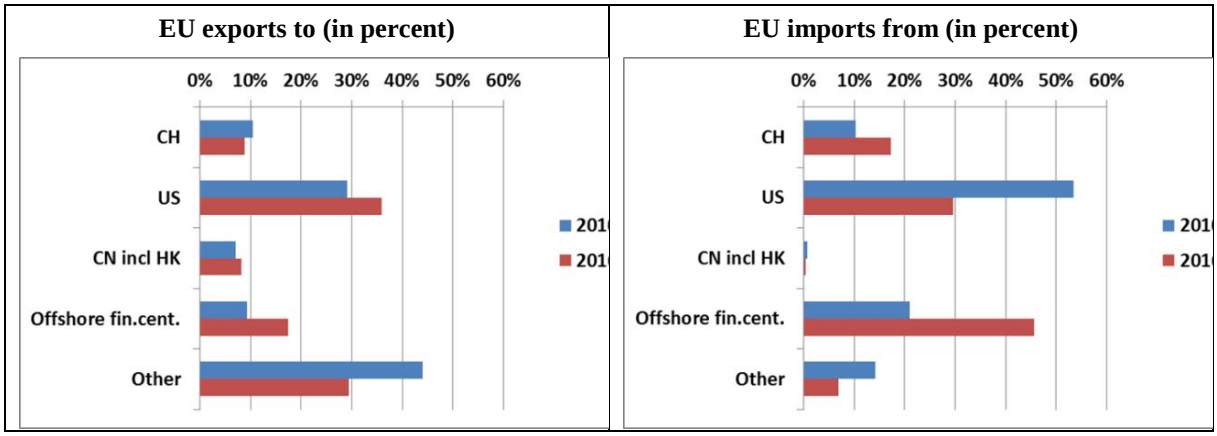


Source: Eurostat database (bop_eu6_q)

For EU, the USA is the main trading partner, both for exports and imports. A large part of the increased exports in 2014 and 2015 went to the USA, on the other hand, increases in imports in

these two years originated mostly from offshore financial centres Figure B shows the geographical breakdown of the EU exports and imports.

Figure B: Charges for the use of intellectual property n.i.e., EU-28 trade with Extra-EU, geographical breakdown (in percent)



Source: Eurostat database (bop_eu6_q)

Among the EU Member States Ireland and the Netherlands are the two major actors in the transactions concerning *Charges for the use of intellectual property*. However, there are some clear differences in their trade pattern. Ireland is, by far, the biggest importer in this category, followed by the Netherlands, France and the United Kingdom. Ireland has the highest contribution to the significant increase in EU imports in 2014 and 2015. The big increase in imports is almost entirely due to the increase in imports from offshore financial centres. The Netherlands are, on the other hand the biggest exporter in this services category, followed by Germany, the United Kingdom and France. Almost 80% of Dutch intra-EU exports go to Ireland. The Netherlands are also the second biggest importer; the biggest partners are Switzerland, USA and offshore financial centres. In trade with extra-EU countries Ireland and the Netherlands account for more than 77% of all EU imports.

Research and development services

The *Research and development services* also play an important role in IPP related transactions. In 2016, this service category accounted for 4.7% of EU's total exports in services and 10.8% of its total imports in services.

EU exports to countries outside the Union (extra-EU) show a slow and steady growth during the years 2010-2016, although the growth rate accelerated a bit in 2015 and 2016. The imports, after a sluggish development during 2010-2014 showed a big increase in 2015 - from €35.1 billion in 2014 up to €48.8 billion in 2015 (39% increase compared to 2014), and a similar increase in 2016, up to €76.8 billion (+57% compared to 2015). Consequently, the imports in 2016 were more than double the amount in 2014.

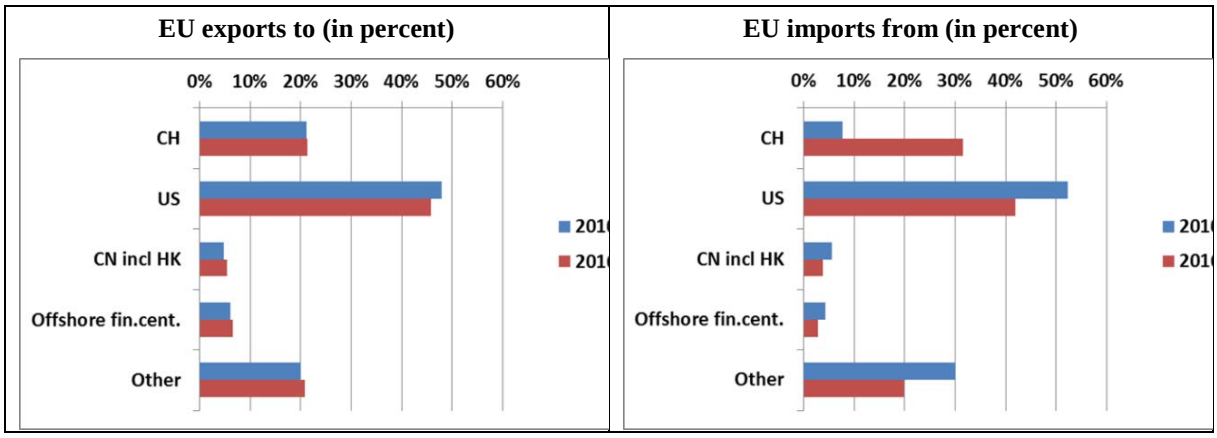
The EU usually has a deficit in its trade with third countries in this category of services. In 2016, the deficit increased to €37.4 billion, which was much more than the combined deficit of the previous eight years.

Figure C: Research and development services, EU-28 trade with Extra-EU (in billion €)

Source: Eurostat database (bop_c6_q)

Figure D shows that the USA is the biggest trading partner, both in terms of exports and imports. About half of the EU exports go to the USA; while more than half of EU imports come from the USA. Unlike in the case of *Charges for the use of intellectual property n.i.e.*, the offshore financial centres play a less dominant role.

Figure D: R&D, EU-28 trade with Extra-EU, geographical breakdown, (in %)



Source: Eurostat database (bop_its6_det)

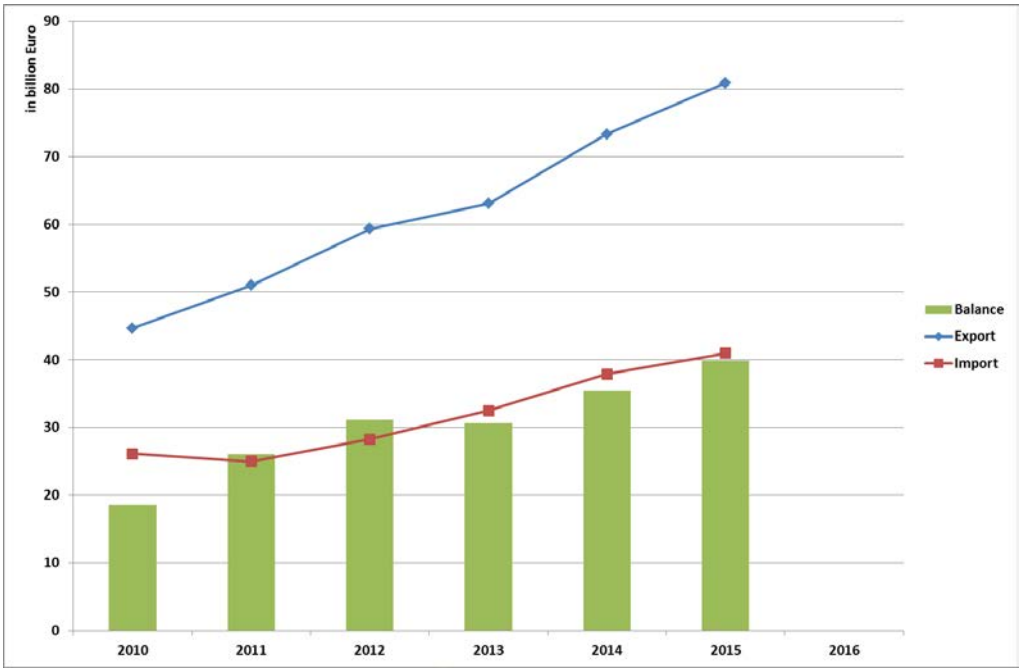
Germany is by far the biggest exporter, followed by France. On the other hand, Ireland is the biggest importer. Germany and France are the other big importers. In 2016, Ireland alone accounted for 98% of the increase in EU imports from extra-EU countries.

Computer services

Unlike the two service categories described above, in *computer services*, the EU records considerable surpluses in its trade with third countries. In recent years both exports and imports have been increasing, but as exports are increasing at a higher rate, the surpluses increased from

€18.6 billion in 2010 to €61.2 billion in 2016. The share of computer services in EU's total exports and imports in services amounts to 10.6% and 4.0% respectively (see Figure E).

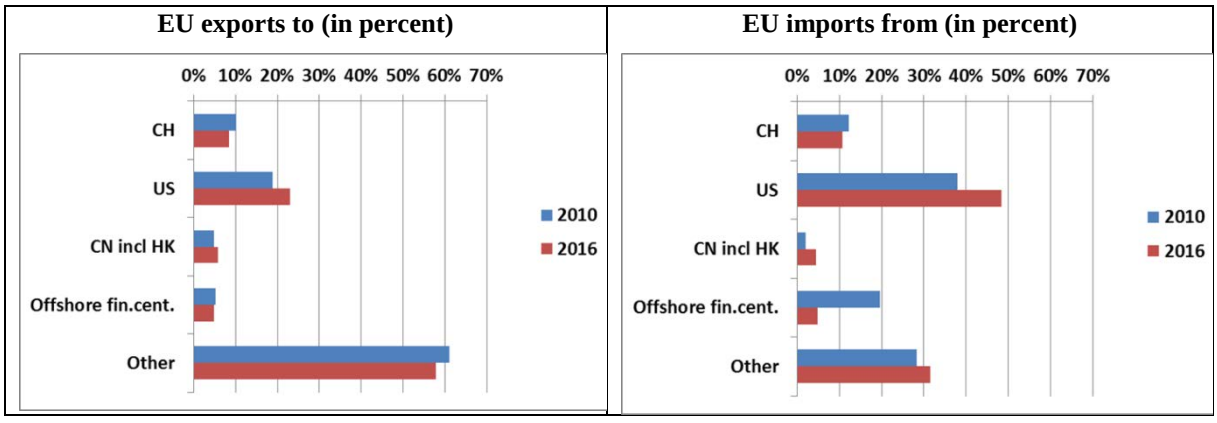
Figure E: Computer services, EU-28 trade with Extra-EU (in billion €)



Source: Eurostat database (bop_its6_det)

The USA is the biggest exporting partner for the EU. The offshore financial centres and Switzerland also play an important role. Around 40% of total EU exports in this category are sent to these three entities. On the other hand the EU imports mainly from offshore financial centres and the USA. Their share in EU imports is more than 70% (see Figure F).

Figure F: EU trade in Computer services with Extra-EU, geographical breakdown (in percent)



Source: Eurostat database (bop_its6_det)

Trade in computer services between Member States is higher than the trade with third countries. Among all Member States, Ireland is biggest exporter of computer services. In 2015, Ireland exports to other Member States amounted for 30% of all intra-EU exports in this category, while in the same year Ireland amounted for 34% of all extra-EU exports. Other major exporters are the Netherlands, Germany and Sweden.