

Economic study on charging VAT on intra-EU supplies of goods and services

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VAT on intra-EU trade

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Preface

This report presents the results of a project on “**Economic study on charging VAT on intra-EU supplies of goods and services**”, specific contract no 6 TAXUD/2012/DE/337. This project is a part of the Framework Service Contract no. TAXUD/2010/CC/104 for the provision of economic analysis in the area of taxation.

The study is performed by CPB (Consortium and Project leader), in cooperation with the consortium members IHS and ETLA. The report is written by Arjan Lejour (CPB and project leader) and Philip Schuster (IHS). For the access for detailed firm level data in Section 5 we made arrangements with a large number of subcontractors: Aarhus University (Denmark), Royal Institute of Technology (Sweden), University College Dublin (Ireland), University of Ljubljana (Slovenia), GREDEG-University of Nice-Sophia-Antipolis (France), University of Nottingham (UK), University of Tartu (Estonia) and University of Valencia in combination with Consejo Superior de Cámaras Oficiales de Comercio Industria y Navegación de España (Spain). Moreover, the Bank of Portugal provided aggregations based on firm level data at no charge.

Philip Schuster, Manuel Bachmann and Thomas Schwab from IHS delivered the results in Sections 2 to 4. Valuable information on country and product specific VAT rates was received from consortium partners working on the project “Study on the economic effects of the current VAT rates structure” under the project leadership of Sandra Müllbacher (IHS). Hans Loof and Pardis Nabavi Larijani (Royal Institute of Technology), Stefanie Haller (University College Dublin), Črt Kostevc (University of Ljubljana), Jaan Masso (University of Tartu), Juan Manez and Juan Sanchez (University of Valencia), Juan de Lucio (Consejo Superior de Cámaras Oficiales de Comercio Industria y Navegación de España), João Amador and Ana Cristina Soares (Bank of Portugal) Mike Milaranta and Nurmi Satu (ETLA), Sanne Hiller (Aarhus University and Leuphana University Lüneburg), Richard Kneller (University of Nottingham), Flora Bellone, Lionel Nesta and Raphaël Chiappini (GREDEG-University of Nice-Sophia-Antipolis) and Ali Aouragh, Fred Kuypers and Arjan Lejour (CPB) have contributed to the results in Section 5. The results/opinions expressed in the report are the responsibility of the authors of the report and cannot be attached to the subcontractors and other contributors. The authors thank the referees Joachim Englisch and Andrea Parolini for their useful comments.

This report has five sections apart from the abstract, executive summary and 8 annexes. The first section presents the background, the objectives and tasks of the study. Section 2 presents the methodology and the results of estimating the intra-EU VAT payments for all EU countries based on goods trade if the EU suppliers levy the VAT of the destination countries. Section 3 focuses on the methodology and results of estimating the intra-EU VAT payments based on services trade. The results of the VAT payments based on the VAT destination principle related to goods and services trade are combined in Section 4. The methodology of using the firm-level data and the estimates of the number of firms affected by levying VAT of the destination countries are presented in Section 5.

Abstract

This paper aims to investigate some consequences in restoring the chain of levying VAT by the supplier for sales to other EU destinations. One of the objectives is an estimate of the number of affected exporting and importing businesses by economic sector based on international transaction data at the firm level. We estimate quite accurately that there are nearly 2.7 million intra-EU exporting and importing firms (traders) in goods. The number of additional intra-EU traders in services is roughly estimated between a half and a million firms. This implies that about one eighth of the European firms would be affected by changes in VAT legislation. The second objective is to determine the size of intra-EU VAT payments if the supplier is charging VAT for the destination country by matching exempted, zero, reduced and standard VAT rates of the destination country at a much disaggregated level to the bilateral trade data. We estimate that under the current system transactions with a value of about 3.1 trillion euros are reverse charged. Around 87 percent are due to goods trade. The corresponding VAT payments are estimated close to 600 billion euros. This gives an indication of the magnitude of intra-EU cross-border VAT payment flows which would occur if the current reverse charge mechanism is replaced by a system under which the supplier charges VAT payable to the tax authorities of the customers' country of establishment.

Abstract (French)

Ce document étudie certaines conséquences de la perception de la TVA par le fournisseur pour les ventes vers d'autres pays de l'Union Européenne. L'un des objectifs est l'estimation par secteur économique du nombre d'entreprises affectées par la mesure, en utilisant des données d'exportation et d'importation au niveau des entreprises. Nous estimons avec une précision relativement élevée qu'il y a près de 2,7 millions d'entreprises exportatrices ou importatrices de biens à l'intérieur de l'UE concernées par la mesure. Le nombre d'entreprises supplémentaires actives dans les services est grossièrement estimé à un chiffre compris entre un demi-million et un million. Cela signifie qu'une entreprise européenne sur huit serait affectée par ces changements dans la législation sur la TVA. Le deuxième objectif est de déterminer le montant des paiements de TVA entre pays membres avec une telle réforme, en faisant correspondre taux de TVA exemptés, nuls, réduits ou standards du pays de destination avec des données de commerce international à un niveau très désagrégé. Nous estimons le montant des transactions soumises au système actuel d'auto-liquidation à environ 3 100 milliards d'euros. Environ 87 pour cent proviennent des échanges de biens. Les paiements de TVA correspondants sont estimés à près de 600 milliards d'euros. Ces estimations donnent une indication de l'ampleur des flux de paiement de TVA entre pays membres qui se produiraient si le mécanisme actuel d'auto-liquidation était remplacé par un système dans lequel le fournisseur perçoit la TVA due aux autorités fiscales du pays d'établissement des clients.

Executive summary

Nearly all VAT levied on cross-border transactions within the EU is collected in the destination country. This system is not without problems. The main problem is the vulnerability of fraud such as missing trade intra-community (MITC) fraud and carousel fraud. One of the guiding principles of a well functioning VAT system is that it should not hamper the ease and safety of doing cross-border business in the EU. This should be as easy and safe as within member states. A second principle is that the compliance costs for VAT has to be reduced or at least not be raised. One, scarcely investigated, option would be to restore the (national) chain of levying VAT by the supplier in such a way that the exporting supplier collects the VAT of the destination country. In this way domestic and intra-EU transactions would be treated similar and this would reduce the scope for MITC and carousel fraud. However, this option would seriously affect internationally trading businesses and tax authorities and could hamper the second guiding principle.

Objectives

This paper aims to investigate some of the consequences of restoring the chain of levying VAT by the supplier including sales to other EU destinations. First, we do not know how many firms exporting and importing goods and/or services within the internal market are likely to be affected. One of the objectives of this study is an estimate of the number of affected exporting and importing businesses by economic sector based on firm-level international transaction data by country. Second, we want to estimate the size of the intra-EU VAT payments if the supplier is charging VAT for the destination country. From national account data, we know the size of intra-EU trade flows of merchandise goods and services but not the VAT payments associated with these trade flows. Due to the exemptions of applying the VAT and the reduced rates, bilateral trade data at a disaggregated level are matched with the VAT rates in the destination country in order to estimate the intra-EU cross-border payments. The estimates of both objectives are based on one year and take the number of trading firms and trade volumes as given. Changes in the VAT system for intra-EU trade could also affect the behaviour of exporters and importers which would depend on the specific design of the system. These possible effects are ignored in this paper.

Potential intra-EU VAT payments

Data on bilateral intra-EU trade flows is provided by the ComExt database for goods and the balance of payments for services for the year 2011. Trade flows are recorded at detailed product or service groups for every country pair, however, no information is provided on the parties involved. Given the different data sources we first calculate estimates for the value of total reverse charged trade and the corresponding VAT for goods before doing the same for services trade. Afterwards both results are combined to give an indication of how large the total value of transactions affected by a change in the reverse charge system would be and how big the total value of intra-EU VAT payments would be. While under the current system the VAT related to cross-border intra-EU supplies is payable by the recipient, the suggested reform would imply that this amount is payable by the supplier and therefore has to be transferred cross-border to the tax authorities of the destination country.

First we did the calculations using data on goods trade which is available at a sufficiently detailed level using the ComExt database. A particular requirement was to identify only the transactions which are reverse charged. This mechanism only applies to trade between taxable persons, i.e. VAT registered businesses, which exceeds some specific thresholds. Hence, business to consumer (B2C) and small trade transactions had to be excluded. However, ComExt does not provide information on the nature of the parties. In principle the data is collected from enterprises with transactions above certain thresholds, which do not necessarily have to coincide with those relevant for applying the reverse charge mechanism. Given the skewed distribution of export trade by firms, i.e. a small share of firms is responsible for a big share of trade, the error from not precisely identifying reverse charging firms close to the threshold margin is likely to be very small. Further, we are not able to identify and exclude long-distance B2C transactions which could be included in the transactions reported by the exporters (referred to as ‘export data’). Data collected by the importing firms (‘import data’) does not suffer from this problem but is valued with freight and insurance costs included, which implies double-counting of these services which are also part of the balance of trade data. As a compromise we compute all results using both data sources, i.e. import and export data. When comparing results we were unable to detect a systematic pattern in the differences. Deviations occur rather randomly which suggests that measurement error probably plays a more significant role than any of the two biases mentioned above.

We attached the most recent VAT rates and the information on exemption to all the product groups at the necessary level of detail for each of the 27 member states. Information on the VAT rates stems from various sources such as official VAT legislative texts and from data provided by consortium partners working on the related study “Study on the economic effects of the current VAT rates structure”. Country specific exemptions for goods are rare and amount to approximately 2 percent of total intra-EU goods trade. Excluding the exempted product groups gives us an estimate of the total value of reverse charged intra-EU goods trade which amounts to 2 656 billion euros using import data and 2 693 billion euros based on export data. The countries receiving the biggest reverse charged supplies are Germany, France and the United Kingdom. The largest sending countries are Germany, the Netherlands and France. Given the estimate of the reverse charged goods trade at the detailed product level for every EU country pair and the information of the corresponding VAT rates in every destination country we were able to compute the VAT payments related with the reverse charge system. Those payments amount to 506 billion euros (import data) or 511 billion euros (export data) which gives an indication of how large intra-EU VAT transfers would be if the reverse charge system was replaced as described above. We furthermore compute the effective VAT rates for every country pair. Those rates are typically only slightly lower than the standard rates reflecting that a majority of affected intra-EU goods trade (about 88 percent) is taken up by product groups without reduced rates. We also performed an analysis at a more aggregated product group level (97 different product groups) which revealed that the import structure of the different member states does not vary strikingly. We further compared results based on import and export data also at this level of aggregation. Except for the category for energy trade deviations are rare which suggests that the quality of the data is satisfactory and errors should be relatively small.

As a next step we carried out a very similar analysis for services trade. Two peculiarities concerning services trade have to be mentioned. First, data on bilateral services trade is of much worse quality

and second, the share of reverse charged transactions is much lower in comparison to goods trade. In principle the supply of services to taxable persons (B2B) is taxed at the customer's place of establishment using the reverse charge mechanism, while the supply to non-taxable persons (B2C) is taxed at the supplier's place of establishment. However, there are many exceptions to the general rule that change the place of taxation which have to be taken into account.

To address the first issue and especially the problem of missing data points for highly disaggregated services trade we applied a procedure to impute the missing values and construct a consistent data set. Potential errors for aggregate figures on VAT payments compared to a fictitious scenario where all missing data points are known can only occur if there is high variation of VAT rates or the exemption rules for different highly disaggregated services categories. Discrepancies between debit (i.e. import) and credit (i.e. export) data are much more severe compared to the data on goods trade. A particular inconsistency is reported for the United Kingdom where service imports according the reporting from the United Kingdom are less than half of the recorded services exports from the other 26 member states to the United Kingdom.

For computing the share of reverse charged services we had to exclude the non-affected categories such as travel, passenger transport, insurance and financial services, merchanting, education and other personal, cultural and recreational services as well as government services. According to our calculations only a share of 62 percent (54 percent if using credit data) of total intra-EU services trade is subject to reverse charge. In absolute numbers this is 411 billion euros (407 billion euros if credit data is used). The corresponding VAT payments amount to 86 billion euros (84 billion euros).

Adding those figures to the results from goods trade gives the total estimates. We compute that under the current system transactions with a value of about 3.1 trillion euros are reverse charged. Only 13 percent are related to trade in services which make the impact of the limited quality of the services trade data less severe. The corresponding VAT payments are estimated close to 600 billion euros. This gives an indication of the magnitude of intra-EU cross-border VAT payment flows which would occur if the current reverse charge mechanism was replaced by a system under which the supplier charges VAT payable to the tax authorities of the customers' country of establishment. The single biggest VAT payment flow amounting to approximately 20 billion euros would be recorded from the Netherlands to Germany. Total intra-EU cross-border VAT payments would make up around 65 percent of combined VAT revenue of all 27 member states. For many countries the calculated payment would even exceed the corresponding revenue. The reason is that the computed VAT payments are not cleared in contrast to existing VAT revenues as firms can reclaim VAT for intermediate goods. Especially small member states with a strong export orientation that are importing a large amount of intermediate goods collect relatively little VAT revenue as a big share of value added figuratively passes through those countries.

The number of intra-EU traders

Data on the numbers of trading firms are not readily available. Many scientific studies using international trade data at the firm level mention the number of exporters (often in goods trade) but do not distinguish EU and non-EU exporters. The national account data of many countries do also not make the distinction between EU and non-EU trade. Therefore we need international transaction data

at the firm level. In many cases it is possible to estimate the number of small traders (below the intrastat threshold on export and import values). Finally, the data are less restrictive towards firms with less than 10 or 20 employees.

Research institutes of 11 EU member states contributed to this project. The countries are Denmark, Estonia, Finland, France, Ireland, the Netherlands, Portugal, Slovenia, Spain, Sweden and the UK. These countries represent about 45 percent of all EU-intra trade. This sample includes large and small countries and northern and southern countries. It is fairly representative, only the new member states are less well represented. The typical institute provides data for the year: 2008, 2009 or 2010. All institutes provide the number of exporters and importers of merchandise trade (agriculture, manufacturing and raw materials) at least above the EU intra trade threshold and the corresponding trade values. For some countries like the Netherlands, Denmark, Finland and Portugal the number of traders below the threshold of intra-EU trade can be counted. For other countries, like Estonia, Ireland and Slovenia it can be estimated. The numbers of service traders and the value of non-financial services trade (both exporters and importers) can be delivered for Portugal, and the UK, although the UK data are from 2003. Together with Eurostat data on all member states we could estimate the number of firms exporting goods to other member states or importing them from other member states.

About 1 million firms in the EU export goods to other member states and 2 million firms import goods in 2009. Most of the intra-EU exporters are also importers. Firms which are exporters and importers are called two-way traders in the economic literature. Nearly two thirds of the intra-EU exporters are two-way traders. This share is determined using the detailed data of the eleven countries mentioned above. The total number of intra-EU traders is thus nearly 2.4 million firms. Because the Eurostat data exclude Belgium and Ireland we have to correct the number of firms to nearly 2.7 million firms. This correction is based on the country shares in intra-EU trade in goods. The estimate on the number of firms trading goods within the EU is fairly accurate, but this is not the case for trade in services. We estimate that additionally half a million to a million firms export or import services within the EU. These are firms which do not export or import goods also. The bandwidth is quite wide. However combined with trade in goods the number of intra-EU traders is 3.2 to 3.7 million firms. This is 10 to 12 percent of the number of VAT taxable persons in the EU. Nearly 90 percent of the firms in the EU will not be affected by a change in the VAT rules related to intra-EU trade because they are only doing business within their own country and some of them with non-EU countries. 1.4 to 1.6 million firms of the 3.2 to 3.7 intra-EU traders are exporters and a majority of these firms also imports from other EU countries. These exporting firms will be mostly affected if they would have to levy the VAT rate of the destination countries. This is about 5 percent of VAT taxable persons in the EU.

From the detailed data of eleven countries we know that most intra-EU traders are manufacturing firms and wholesale firms. The contribution of firms in other sectors is minor. About half of the firms are very small firms with at most nine employees. Only a small percentage of these firms are large firms with more than 250 employees. These latter firms contribute most to total trade, about 40 percent. The distribution of exports and imports across firms is thus skewed. This also implies that firms are differently affected by changes in the VAT rules. To what extent firms are affected depends also on the number of traded products and services and the number of trading partners within the EU.

Executive summary (French)

La quasi-totalité de la TVA prélevée sur les transactions transfrontalières au sein de l'UE est perçue dans le pays de destination. Ce système n'est pas sans problèmes. Le problème principal est la vulnérabilité à la fraude, tels que la fraude intracommunautaire dite à *l'opérateur défaillant* et la fraude *carrousel*. L'un des principes directeurs d'un système de TVA qui fonctionne bien est qu'il ne doit pas entraver la facilité et la sécurité des affaires transfrontalières. Cela devrait être aussi facile et sûr qu'à l'intérieur des frontières de pays membres. Un second principe est que les coûts de mise en conformité aux règles TVA doivent être réduits, ou, à tout le moins, ne pas être plus élevés. Une option peu souvent étudiée serait de restaurer la chaîne (nationale) de perception de la TVA par le fournisseur de telle manière que le fournisseur exportateur recueille la TVA du pays de destination. De cette façon, les transactions domestiques et intracommunautaires seraient traitées de la même manière, permettant de réduire les possibilités de fraude à l'opérateur défaillant et de fraude carrousel. Toutefois, cette option aurait un impact fort sur les entreprises actives dans le commerce international ainsi que les autorités fiscales, entrave potentielle au deuxième principe directeur.

Objectifs

Ce document étudie certaines des conséquences de la restauration de la chaîne de perception de la TVA par le fournisseur, y compris sur les ventes à destination d'autres pays membres de l'UE. Premièrement, nous ne savons pas combien d'entreprises exportant ou important biens ou services dans le marché intérieur sont susceptibles d'être affectées. L'un des objectifs de cette étude est une estimation du nombre d'entreprises touchées par secteur, utilisant des données de commerce international au niveau des entreprises. Deuxièmement, nous voulons estimer la taille des paiements TVA intracommunautaires si le fournisseur perçoit la TVA pour le pays de destination. A partir des données de comptes nationaux, nous connaissons le volume des échanges entre pays de l'UE, mais pas les paiements de TVA liés à ces flux. Tenant compte des exemptions à l'application de la TVA et des taux réduits, les données désagrégées d'échanges commerciaux bilatéraux sont jumelées avec les taux de TVA des pays de destination afin d'estimer les paiements transfrontaliers intracommunautaires.

Paiements intracommunautaires de TVA potentiels

Les données sur les échanges bilatéraux intra-UE sont issues de la base de données ComExt pour les biens et de la balance des paiements pour les services, pour l'année 2011. Les flux commerciaux sont comptabilisés au sein de groupes de produits ou de services pour chaque couple de pays. Cependant, aucune information n'est fournie sur les parties concernées. Compte tenu des différentes sources de données, nous calculons les premières estimations de la valeur totale des échanges affectés par la procédure d'auto-liquidation et la TVA correspondante pour les biens, puis pour les services. Les deux résultats sont ensuite additionnés pour donner une indication de la valeur totale des transactions affectées par un changement dans le système d'auto-liquidation et de l'ampleur des paiements de TVA intracommunautaires associés. Alors que dans le système actuel la TVA sur les transactions intracommunautaires est payable par l'acquéreur, la réforme proposée impliquerait que ce montant soit payable par le fournisseur et doit donc être transféré aux autorités fiscales du pays de destination.

Nous avons d'abord fait les calculs en utilisant des données sur le commerce des biens, disponible à un niveau suffisamment détaillé dans la base de données ComExt. Une exigence particulière était d'identifier les seules transactions concernées par l'auto-liquidation. Cette procédure s'applique uniquement aux échanges entre sociétés inscrites au registre de la TVA, dépassant des seuils spécifiques. Ainsi, transactions d'entreprises à consommateur (B2C) et petites transactions de commerce international ont dû être exclues. Cependant, ComExt ne fournit pas d'informations sur la nature des parties impliquées. En principe, les données sont collectées auprès des entreprises avec des transactions supérieures à certains seuils, qui ne coïncident pas forcément avec les seuils qui sont pertinents pour l'application du mécanisme d'auto-liquidation. Compte tenu de la répartition inégale des exportations par les entreprises – une petite part des entreprises étant responsable d'une grande part du commerce international – l'erreur de ne pas identifier précisément les entreprises à proximité du seuil applicable à l'auto-liquidation est vraisemblablement très faible. En outre, nous ne sommes pas en mesure d'identifier et d'exclure les transactions B2C longue distance qui pourraient être incluses dans les transactions déclarées par les exportateurs (dénommées «données d'exportation»). Les données recueillies par les entreprises importatrices («données d'importation») ne sont pas pénalisées par ce problème mais sont évaluées avec les coûts de transport et d'assurance, double comptabilisation de ces services puisqu'ils apparaissent également dans les données de la balance des paiements. En guise de compromis, nous avons calculé et comparé les résultats en utilisant deux sources de données, à savoir les données d'exportation et les données d'importation. En comparant les résultats, il n'est pas possible de détecter de déviation systématique. Les écarts se produisent plutôt au hasard, ce qui suggère que l'erreur de mesure joue un rôle plus important que chacun des deux biais mentionnés ci-dessus.

Nous avons liés les taux de TVA les plus récents et l'information sur les exemptions aux informations commerciales de groupes de produits, à un niveau de détail suffisant, pour chacun des 27 pays membres de l'UE. Les informations sur les taux de TVA proviennent de diverses sources, telles que textes législatifs officiels et données fournies par les partenaires du consortium travaillant sur l'étude « Study on the economic effects of the current VAT rates structure ». Les exemptions spécifiques à chaque pays sur la taxation du commerce des biens sont rares et représentent environ 2 percent du total des échanges intracommunautaires. Excluant les groupes de produits exemptés, l'estimation de la valeur totale des échanges commerciaux intracommunautaires soumis aux procédures d'auto-liquidation est de 2 656 milliards d'euros en utilisant les données d'importation et de 2 693 milliards d'euros en utilisant les données d'exportation. Les pays qui réceptionnent les plus gros flux concernés par l'auto-liquidation sont l'Allemagne, la France et le Royaume-Uni. Les pays émetteurs des plus gros flux sont l'Allemagne, les Pays-Bas et la France. A l'aide de l'estimation des flux concernés par l'auto-liquidation pour chaque groupe de produit et couple de pays, ainsi que de l'information des taux de TVA pour chaque pays de destination, nous avons pu estimer les paiements de TVA du système d'auto-liquidation. Ces paiements se montent à 506 milliards d'euros (données d'importation) et 511 milliards d'euros (données d'exportation), donnant une indication de la taille des transferts de TVA intracommunautaires si le système d'auto-liquidation devait être modifié comme décrit ci-dessus. Nous avons également calculé les taux effectifs de TVA pour chaque couple de pays. Ces taux sont généralement légèrement inférieurs aux taux standards, ce qui laisse supposer que la majorité des échanges de marchandises intra-UE (environ 88 pour cent) provient de groupes de produits sans taux réduits. Nous avons aussi effectué une analyse à un niveau de groupe de produits plus agrégé (97

groupes de produits différents) qui a révélé que la structure des importations des différents pays membres ne varie pas de façon significative. Nous avons finalement comparé les résultats basés sur les données d'importation à ceux basés sur les données d'exportation à ce niveau d'agrégation. Sauf pour la catégorie du commerce d'énergie, les différences sont rares ce qui suggère que la qualité des données est satisfaisante et que les erreurs sont relativement faibles.

Dans la phase suivante, nous avons réalisé une analyse très similaire pour le commerce des services. Deux particularités concernant le commerce des services doivent être mentionnées. Premièrement, les données sur le commerce bilatéral des services sont de bien moindre qualité. Ensuite, la part des transactions concernées par le système d'auto-liquidation est beaucoup plus faible, comparée au commerce de biens. En principe, la fourniture de services à des sociétés (B2B) soumises à la TVA est taxée selon le lieu du client à l'aide du mécanisme d'auto-liquidation, tandis que l'offre à des personnes non imposables (B2C) est taxée selon le lieu d'établissement du fournisseur. Il existe cependant de nombreuses exceptions à la règle générale qui changent le lieu d'imposition et qui doivent être prises en compte.

Pour traiter de la première problématique, en particulier les données manquantes sur le commerce international de services à un niveau suffisamment désagrégé, nous avons appliqué une procédure d'imputation des valeurs manquantes et construit une base de données cohérente. Les erreurs potentielles d'estimation des paiements totaux de TVA, par rapport à un scénario fictif où il n'y a pas de données manquantes, ne peuvent se produire qu'en cas de forte variation des taux de TVA ou des règles d'exemption pour les différentes catégories de services désagrégées. Les écarts entre données de débit (c'est-à-dire, import) et de crédit (c'est-à-dire, export) sont beaucoup plus importants que pour les données de commerce international de biens. Une incohérence particulière est à signaler pour le Royaume-Uni, où les importations de services selon la déclaration du Royaume-Uni sont inférieures à la moitié des exportations de services vers le Royaume-Uni par les 26 autres pays membres de l'UE.

Pour le calcul de la part des services concernés par la procédure d'auto-liquidation, nous avons dû exclure les catégories non touchées telles que les voyages, le transport de passagers, l'assurance et les services financiers, le négoce, l'éducation et autres services personnels, culturels et de loisirs ainsi que les services gouvernementaux. Selon nos calculs, une part de seulement 62 percent (54 percent si l'on utilise les données de crédit) du total des échanges de services intracommunautaires est soumise à auto-liquidation. En chiffres absolus, cela représente 411 milliards d'euros (407 milliards d'euros si les données de crédit sont utilisées). Les paiements de TVA correspondants s'élèvent à 86 milliards d'euros (84 milliards d'euros avec les données de crédits).

L'ajout de ces chiffres aux résultats issus du commerce international des biens donne les estimations totales. D'après nos calculs, le montant total des transactions concernées par le système actuel d'auto-liquidation s'élève à environ 3 100 milliards d'euros. Seulement 13 percent sont liés au commerce des services, limitant l'impact de la qualité moyenne des données sur les services. Les paiements de TVA correspondants sont estimés à près de 600 milliards d'euros. Cela donne une indication de l'ampleur des flux intracommunautaires de paiements TVA qui se produiraient si le mécanisme actuel d'auto-liquidation était remplacé par un système dans lequel le fournisseur percevrait la TVA due aux

autorités fiscales du pays de résidence des clients. Le plus large flux de paiement de TVA s'élèverait à environ 20 milliards euros, des Pays-Bas à l'Allemagne. Le total des paiements transfrontaliers de TVA entre membres de l'UE serait de l'ordre de 65 percent des recettes de TVA combinées de tous les 27 pays membres. Pour de nombreux pays, le paiement calculé dépasserait même les recettes de TVA. Par exemple pour la Slovaquie, la TVA à percevoir auprès d'opérateurs non établis pourrait constituer presque le double des recettes de TVA actuelles du pays. Pour les autres pays membres, comme la Belgique, l'Estonie, la Hongrie, l'Irlande ou la République Tchèque, la part des paiements de TVA potentiels reçus excéderait largement 100 percent des recettes actuelles. La raison est que les paiements de TVA calculés ne sont pas compensés, contrairement aux recettes de TVA existantes où les entreprises peuvent récupérer la TVA pour les biens intermédiaires. En particulier, les petits pays membres avec une forte orientation vers l'exportation qui importent une grande quantité de biens intermédiaires recueillent relativement peu de recettes de la TVA, une grande part de la valeur ajoutée ne faisant pour ainsi dire que traverser le pays.

Le nombre de commerçants intracommunautaires

Les données sur le nombre d'entreprises commerciales ne sont pas facilement disponibles. De nombreuses études scientifiques utilisant des données de commerce international au niveau entreprise mentionnent le nombre d'exportateurs (souvent dans le commerce des biens), mais ne distinguent pas les exportateurs qui sont actifs avec l'UE et ceux qui sont actifs hors de l'UE. Les données de comptes nationaux de nombreux pays ne font pas non plus la distinction entre le commerce au sein de l'UE et le commerce en dehors de l'UE. C'est pourquoi nous avons besoin de données sur les transactions internationales au niveau des entreprises. Dans de nombreux cas, il est possible d'estimer le nombre de petits commerçants (en dessous du seuil Intrastat sur la valeur des exportations et des importations). Enfin, les données sont moins restrictives à l'égard des entreprises de moins de 10 ou 20 employés.

Des instituts de recherche de 11 pays membres de l'UE ont contribué à ce projet. Les pays concernés sont le Danemark, l'Espagne, l'Estonie, la Finlande, la France, l'Irlande, les Pays-Bas, le Portugal, la Slovaquie, la Suède et le Royaume-Uni. Ces pays génèrent environ 45 pour cent du commerce intracommunautaire. Cet échantillon comprend des grands et petits pays ainsi que des pays du nord et des pays du sud. Assez représentatif, seuls les nouveaux pays membres sont moins bien représentés dans l'échantillon. Typiquement, chaque institut fournit des données pour l'année 2008, 2009 ou 2010. Tous les instituts fournissent le nombre d'exportateurs et importateurs de marchandises (agriculture, fabrication et matières premières) au moins au-dessus du seuil des échanges intra-UE et les valeurs de flux commerciaux correspondantes. Pour certains pays comme les Pays-Bas, le Danemark, la Finlande et le Portugal le nombre de commerçants en dessous du seuil des échanges intra-UE peut être compté. Pour les autres pays, comme l'Estonie, l'Irlande et la Slovaquie, il peut être estimé. Le nombre de commerçants en services et la valeur du commerce des services non financiers (aussi bien exportation qu'importation) peuvent être livrés pour le Portugal et le Royaume-Uni, bien que les données du Royaume-Uni datent de 2003. Avec les données d'Eurostat sur tous les pays membres, nous avons pu estimer le nombre d'entreprises qui exportent ou importent des biens d'autres pays membres.

Environ 1 million d'entreprises exportent des biens vers d'autres pays membres et 2 millions d'entreprises importent des biens, en 2009. La plupart des exportateurs intra-UE sont aussi des importateurs. Les entreprises qui sont aussi bien exportatrices qu'importatrices sont appelées *two-way traders* dans la littérature économique anglo-saxonne (que l'on peut traduire par entreprises imports/exports). Près des deux tiers des entreprises qui exportent au sein de l'UE sont en fait des entreprises imports/exports. Cette part est déterminée en utilisant les données détaillées des onze pays mentionnés ci-dessus. Le nombre total de commerçants intra-EU approche donc 2,4 millions d'entreprises. Comme les données d'Eurostat excluent Belgique et Irlande, le nombre d'entreprises doit être corrigé et atteint 2,7 millions d'entreprises. La correction est basée sur la part de ces pays dans les échanges intracommunautaires de biens. Alors que l'estimation du nombre d'entreprises faisant commerce de biens au sein de l'UE est assez précise, ce n'est pas le cas pour le commerce des services. Nous estimons qu'entre un demi-million et un million d'entreprises sont actives dans l'exportation ou l'importation de services au sein de l'UE, sans être actives dans le commerce de biens. La marge d'incertitude est assez large. Cette marge d'incertitude est cependant moindre lorsque l'on considère le nombre total d'entreprises actives dans le commerce de biens et de services au sein de l'UE, compris entre 3,2 et 3,7 millions. Toutes ces entreprises seraient affectées par un changement dans les règles TVA sur les échanges intracommunautaires, les effets pour les exportateurs et les importateurs étant différents. Il s'agit de 10 à 12 pour cent du nombre d'entreprises assujetties à la TVA dans l'UE. 85 à 90 pour cent des entreprises de l'UE ne seraient pas affectés par un changement dans de règles, ne faisant du commerce qu'à l'intérieur de leur propre pays ou avec des pays non membres de l'UE.

D'après les données détaillées de onze pays, nous savons que la plupart des commerçants intracommunautaires sont des entreprises impliquées dans la production ou le commerce de gros. La contribution des entreprises d'autres secteurs est mineure. Environ la moitié des entreprises sont très petites, comptant neuf employés au plus. Seul un petit pourcentage de ces entreprises comptent plus de 250 employés. Ces dernières contribuent le plus aux échanges commerciaux, à hauteur de 40 pour cent. La répartition des exportations et des importations par entreprise est donc asymétrique. Cela implique également que les entreprises sont affectées de manière différente par des changements de règles TVA. Dans quelle mesure les entreprises sont touchées dépend aussi du nombre de produits et services échangés ainsi que du nombre de partenaires commerciaux au sein de l'UE.

1. Background and objectives

1.1 Background

Currently most of the VAT levied on cross-border transactions is collected in the destination country. This was intended to be a transitional system as the EU member states committed themselves already in 1967 to a VAT system based on the origin principle. The value added of a product or service should be taxed in the member state where it is generated. However, a VAT system based on the origin principle is not politically feasible as was also concluded by the European Commission (2011). It may not even be desirable from an economic perspective considering the loss of flexibility it entails, the risk of trade diversion and distortion in the single market and its incompatibility with heterogeneous VAT systems (European Commission, 2012) given the complexity of the VAT systems including standard rates, reduced rates and exemptions

The VAT system based on the destination principle will remain in place. This system is, however, not without its problems and the Commission is searching for improvements of the system. One of the problems concerns the current vulnerability for fraud such as the missing trade intra-community (MITC) fraud and carousel fraud. The Commission intends to present ultimately in the first half of 2014 a legislative proposal with the definitive regime of taxing intra-EU trade. One of the guiding principles of a well functioning VAT system is that it should not hamper the ease and safety of doing cross-border business in the EU. This should be as easy and safe as within member states. A second principle is that the compliance costs for VAT should be reduced or at least not raised. These principles were also supported by the European Council (2012) in its conclusions of May 15, 2012. One option to do so is to reduce the complexity and number of VAT procedures (IFS, 2011). The number and complexity of these procedures varies considerably by member state. The complexity could also be reduced by limiting exemptions and phasing out reduced rates. The IFS study suggests that there are potential welfare gains by increasing the efficiency of the VAT systems in this way.

The differences in VAT regimes, exemptions and reduced rates generate high costs in terms of the distortion and fragmentation of the internal market. Reducing the complexity and number of VAT procedures would certainly reduce these distortions of the single market. Another, scarcely investigated, option would be to restore the (national) chain of levying VAT by the supplier in such a way that the exporting supplier¹ collects the VAT of the destination country. In this way domestic and intra-EU transactions would be treated similar and this would reduce the scope for MITC and carousel fraud. However, this option would seriously affect internationally trading businesses and tax authorities. Exporting suppliers had to have more information on the VAT system in the destination countries, in particular if they have customers in many different member states. Moreover, the VAT payments paid by the foreign customer and received by the exporting supplier have to be transferred to the destination country, corrected for VAT paid by the supplier. Therefore, an intra-EU VAT payment system has to be designed without raising the administrative burdens for firms. The VAT

¹ Note that we use the terms exports and imports as is common in the trade literature, also for intra-EU trade. Formally the EU uses the terms dispatches and arrivals.

flows between countries could be substantial knowing that intra-EU trade in goods amounts to about 2700 billion euro and intra-EU trade in services is about 700 billion euro in 2011.

1.2 Objectives

Before the option to restore the chain of levying VAT by the supplier including sales to other EU destinations could be considered as a policy proposal it is useful to investigate its consequences.

If charging VAT on all suppliers of intra-EU trade were be a feasible option the question is who would be affected by this change in policy? First, we do not know how many firms exporting and importing goods and/or services inside the internal market are likely to be affected. One of the objectives of this study is, first, an attempt to estimate the number of affected exporting and importing businesses. Moreover it is not known whether all economic sectors in the EU are equally affected. Therefore we aim to present the number of intra-EU exporters and importers not only at the economy wide level but also at the sectoral level (NACE 2 digit level).

Second, we want to know the size of the intra-EU VAT payments if the supplier is charging VAT for the destination country. From national account data, we know the size of intra-EU merchandise goods and services trade flows but not the VAT payments involved with these trade flows. Due to the exemptions of applying VAT and the reduced rates we have to collect bilateral trade data at a disaggregated level to match these with the VAT rates in the destination country. Then we are able to estimate the value of intra-EU cross-border payments.

1.3 Tasks

Based on these objectives DG Taxud has asked to perform three tasks. Tasks 1 and 2 aim to estimate the size of the intra-EU VAT payments based on sales of goods and services, respectively. Task 3 aims to estimate the number of firms that are affected in the EU.

1. To provide an estimate of the total value of intra-EU transactions in goods exempted from VAT under the current system (in the EU as a whole and for each Member State of exemption and for each Member State of taxation) and the rate and value of VAT paid by the recipient on those transactions.
2. To provide an estimate of the total value of intra-EU transactions in services on which no VAT is charged by the supplier under the current system and the rate and value of VAT paid by the customer/recipient on those transactions (in the EU as a whole and for each Member State of establishment of the supplier and for each Member State of taxation).
3. To provide an estimate, in the EU as a whole and for each Member State of establishment, of the number of suppliers and customers carrying out exempted or subject to reverse charge supplies of goods or services (with a detailed breakdown by turnover and by comparison (percent) to total number of businesses).

2 Value added tax on bilateral trade in goods

The aim of this section is to answer specific questions connected to a potential reform of the existing reverse charge mechanism in intra-EU trade. This section specifically focuses on goods trade, while section 3 carries out a similar analysis for services trade before the results are combined in the recapitulative section 4. The task is to provide an estimate of the total value of goods exempted (with a right to deduct) from VAT subject to Article 138 of the 2006 VAT Directive, i.e. of intra-EU transactions in goods subject to the destination principle which excludes small trade and business to consumer (B2C) transactions which are taxed at the source as well as long-distance B2C trade. Further, we compute an estimate of the involved VAT payment that is reverse charged according to Articles 194 and 195², i.e. payable by the purchaser subject to the VAT rate of his or her country³. The estimate of the reverse charged VAT gives an indication on the potential cross-border VAT payment flows which would occur if the reverse charge mechanism would be replaced by a system where VAT is charged and payable by the supplier, like done for typical supplies within a member state, instead of the purchaser. Throughout the report we will refer to those flows as possible or **potential VAT payments**. One has to mention at this point that the estimation of the potential VAT payments relies on a static analysis assuming that firm behaviour would not change in case of an abolishment of the reverse charge system. In particular changes in compliance burdens to engage in intra-Community trade could lead to a variation in the number of traders (see section 5) and trade pattern and therefore also in trade volume and potential VAT payments. Behavioural effects of that sort were not taken into account. The next subsections describe the used data sources and their limitations, the methodology and the results.

2.1 Data source

The ComExt intra- and extra-European trade database provides the value of merchandise trade among EU member states, and between member states and global partners. ComExt, prepared by Eurostat, is based on data from the 27 member states. ComExt data is classified according to the Combined Nomenclature (CN) system used by Eurostat. The CN is an eight-digit subdivision of the Harmonised System (HS), comprising four two-digit levels: HS2, HS4, HS6 and CN8.⁴ Goods in transit are omitted from the statistics, while goods trade between enterprises under common ownership is included. This means that coverage of the database and the group of goods subject to Article 138 are well aligned with some exceptions that are discussed below.

Bilateral trade data for both, goods as well as services trade (section 3), is taken from the year 2011. In principle there are two ways of measuring a trade transaction, at the place of the supplier (export data) and the place of the receiver (import data). A well-known problem of bilateral international

² With respect to Article 197 the available data did not allow to address the issue of triangular trade. Eurostat (2006, 2009) explicitly warns that the data could be inadequate.

³ Note that Article 199 in addition specifically permits Member States to reverse charge certain B2B supplies, such as industrial and non-industrial waste. Our estimations consequently also include the abolishment of these reverse charged supplies.

⁴ For the data from 2011 the level of detail is as follows. HS2 consists of 97 product groups, HS4 of 1 633, HS6 of 7 086 and CN8 of 16 077.

trade data is that the figures of the reporting exporting country and importing country often differ.⁵ Mark Gehlhar has done a labour-intensive job in harmonising these data for the GTAP database, but this is only done for about 40 agricultural and manufacturing sectors. It is impossible to do this at the product level. Instead we provide results computed using both data sources and highlight the differences.

The trade data of ComExt are delivered by the member states according to specific outlines. Within the countries the data are gathered by questioning firms on their import and export behaviour with respect to intra-EU trade. Firms are obliged to deliver the information with respect to the type of trade goods and the trading country at least above a certain threshold on international sales. Firms do not deliver information on their counter party in the origin or destination country.⁶ Potentially the intra-EU exports reflect business to business (B2B) trade and long-distance trade to consumers. It does not include cross-border shopping or other imports to consumers directly. To our knowledge there are no detailed databases with figures on bilateral cross-border shopping in the EU.⁷ As a result the import data contain in principle only B2B trade.⁸ Because only B2B trade is relevant for the tasks in this study, it could be preferable to use reported import data from ComExt instead of export data which could also include some B2C trade (long-distance). On the other hand, the import values include freight and insurance costs (CIF) which are excluded from the export transactions which are measured free on board (FOB).

Using export data we could overestimate the possible VAT flows. There is no detailed information on the relevance of B2C trade. Copenhagen Economics (2007) concludes that books, CDs/DVDs, airline tickets and event tickets are often sold by internet which could indicate that these purchases could also easily be made across borders. However the study does not indicate the quantitative importance of intra-EU trade of these goods. Hence, both choices have their merits and drawbacks. In accordance with the European Commission we provide results for both, export and import data.

Moreover, the data are detailed at the product level but do not contain any information with respect to the firm. We are not able to identify small traders below the export threshold value who have the option to levy the VAT rate of the sourcing country instead of the VAT rate of the destination country.⁹ From the skewed distribution of exports values by firms¹⁰ we know that small traders hardly

⁵ See Gehlhar (1996) and Lejour et al. (2008).

⁶ For more information see Eurostat (2006 and 2009).

⁷ Of course there is the well-known example of cross-border trade by Danish consumers from 2005 which is discussed extensively in Copenhagen Economics (2007). However, this case is mainly driven by the large VAT rate differences between Germany and Denmark and cannot be considered as a representative example of cross-border shopping in the EU.

⁸ However, all documentation on trade statistics does not mention B2B and B2C trade, so it is hard to find confirmation of this conclusion for all countries. Contacts with Statistics Netherlands verify that direct trade to consumers is not registered. Therefore it is not included in detailed trade databases, although it could be included in the aggregate trade figures using other national statistics.

⁹ In this context the origin principle can be applied for two reasons. First, a non-taxable legal person buys goods from another member state worth less than an annual threshold (depending on the member state, at least 10 000 EUR). Second, a supplier supplies goods worth less than 35 000 or 100 000 annually (depending on the member state) to another member state.

¹⁰ See Ottaviano and Mayer (2007).

contribute to the total trade value. This implies that neglecting the role of small traders because of data limitations will hardly affect the estimates of intra-EU VAT payments. Moreover, the databases only allow us to work with the values of bilateral trade and not the volumes. Table A2.1 in the annex lists the names and the share in total trade of the 97 product groups at the HS2 level. To confront the problem of overestimation using export data we indicate which of those groups could suffer from the long-distance B2C bias mentioned above. Due to the lack of data we can only rely on anecdotal evidence and results as presented in Copenhagen Economics (2007). Potential long-distance B2C trade categories like books or CDs/DVDs have a very small share in total trade. Books belong to the HS2 category 49 and make up 0.43 percent of intra-EU trade. However, one can still assume that a majority of this is not long-distance selling. Similar figures are reported for other typical long-distance B2C transactions: CDs/DVDs are part of HS4 8523 which makes up 0.42 percent of total intra-EU trade, clocks and watches (HS2 91) have a share of 0.09 percent, musical instruments (HS2 92) make up 0.03 percent and toys, games and sport requisites (HS2 95) are recorded at a share of 0.62 percent. We conclude that overestimation due to B2C long-distance transactions is likely to play a minor role.

Using the value of bilateral trade at the product level between each pair of EU countries we can estimate the amount of VAT payments which should be added to the value of trade if the exporter would collect the VAT applying the rates of the destination country. The trade data is analysed at such a detailed product level such that the products can be linked to the relevant VAT rate (standard rate, reduced rate, zero rate or exempted). The data was extracted from ComExt on January 24, 2013 for the year 2011. Hence, any subsequent revisions were not taken into account. All calculations are carried out using the most detailed data set, i.e. data for CN8 product levels, which we if necessary aggregate to less detailed levels.¹¹

Data on the corresponding VAT rates is collected from various sources. Those include primary sources as consolidated versions of the country-specific legislative texts (if available) as well as secondary sources for other countries provided by partner institutions involved in the related study “Study on the economic effects of the current VAT rates structure”. As there is no single consistent data source we always use the most recent available data on VAT rates. This implies that the rates are not necessarily measured at the same point in time. We try to collect the VAT rate information as close as possible to the current legal situation, i.e. March 2013 but not later. This means that already enacted but not yet effective future changes in VAT rates have not been taken into account. Country-specific details can be found in the annex in Table A5.1.

2.2 Methodology

The methodological steps are straightforward though labour-intensive. After the preparation of the data we had to assign a flag for “exempted” or “not exempted” and the according VAT rate to every of the 16 077 different product groups at the CN8 level. When possible the matching was done at a lower digit level which was then automatically carried over to the CN8 precision. This procedure had to be done for all 27 member states. The previous subsection already discussed the problem of overestimation because of long-distance B2C trade. Given that an exclusion of some of the potential

¹¹ As a consequence this implies that the countries’ aggregate trade flows computed from summing over all product groups slightly differ from directly reported aggregates in ComExt.

categories would very likely result in an underestimation that is much more severe than the overestimation bias we did not exclude any of the product categories. Hence, the relevant tax bases, which we refer to as **affected trade flows** are simply the **total trade flows** without categories that are exempted due to country-specific regulations. For goods those exemptions are very rare and amount to approximately 2 percent of total trade on average. Multiplying the affected bilateral trade flows for every CN8 product group with the corresponding VAT rate of the destination country gives the value of reverse charged VAT for every product group and every country pair. This value is then used as an estimate for cross-border VAT payment flows which would occur if the reverse charge mechanism was replaced as discussed above. The **potential VAT payment flows** are then aggregated at HS2 level. The effective VAT rate, i.e. the potential VAT payment flow divided by the affected trade flow can then be a mixture of the standard and a reduced rate if different rates are assigned to the sub-level product groups. Attached to this report we provide the results for all countries at the HS2 level in electronic form. Tables A2.2 and A2.3 in the annex contain an extract of the effective tax rates for some selected HS2 categories as an illustration. We also aggregate over all HS2 product groups to provide a compact table on the information how much in potential VAT every country is sending or receiving to the other 26 member states.

2.3 Results

The presentation of the results follows the steps of their computation. That means we first report tables on **total bilateral goods trade**, before analysing **affected bilateral goods trade**, i.e. the relevant tax base which excludes exempted goods trade flows. Given the tax base we can compute the related **VAT payments** in absolute and relative terms. All tables are presented using import and export data. Results for those bilateral transactions are presented symmetrically, i.e. transactions going into a country as well as out of it. Afterwards we report the VAT payments for some large products groups (at the two digit level, i.e. HS2) and highlight the sectorial differences between different member states.

Table 2.1 and Table 2.2 show **total bilateral goods trade** for the year 2011 using import and export data, respectively. The three biggest goods trade flows are exports from the Netherlands to Germany (import data: 116 bn EUR, export data: 115 bn EUR), from Germany to France (import data: 97 bn EUR, export data: 101 bn EUR) and from France to Germany (import data: 68 bn EUR, export data: 70 bn EUR). Other significant flows, i.e. larger than 50 bn EUR, are reported for the following country pairs: exports from Germany to Austria, Belgium, Italy, the Netherlands and the United Kingdom, exports from Belgium to France and Germany as well as exports from the Netherlands to Belgium.

The column sums of Table 2.1 and Table 2.2 represent total goods imports per country from the other 26 member states, while the row sums have to be interpreted as the total goods exports per country to the other 26 member states. Imports range from less than 4 billion EUR for Malta to more than 550 billion EUR for Germany. In total, trade flows based on export data exceed those based on import data by +1.5 percent. However, difference for individual countries can be quite sizeable and vary from +10.3 percent for Lithuania to -10.6 percent for Malta. Next to pure measurement error the differences can be attributed to two factors. First, B2C trade is treated differently and second, the valuation of the trade flows also differs depending on whether import or export data is used. As argued before, both

methods tend to overestimate the relevant flows required for the analysis for different reasons. One could conclude that the bias stemming from non-identified B2C trade (export data) is larger than the bias caused by CIF instead of FOB-valuation (import data) in total. However, the pattern of higher export data based trade flows does not systematically hold at more disaggregated levels, e.g. it varies depending on partner countries and also between product groups, as will be shown later. Hence, measurement error has to play a prominent role in the explanation of those differences.

Table 2.3 and Table 2.4 report **affected bilateral goods trade** for 2011. In contrast to Table 2.1 and Table 2.2 we country-specifically excluded product groups that are exempted from VAT. Typical excluded categories are supply of ships and aeroplanes, jet fuel, postage stamps, human blood, transfer of personal property belongings when changing country of residence, etc. In contrast to services those exemptions are relatively rare and have a small share in total trade of about 2 percent. The biggest deviation of total to affected trade is recorded for Malta (about 10 percent using export data) which can be explained by a relatively high share of ships and aeroplanes sourced from other member states.

Possible cross-border VAT payments related to goods trade are reported in Table 2.5 and Table 2.6, again first using import data and then for export data. Column sums have to be interpreted as possible VAT payments received while row sums are possible VAT payments sent. The figures are computed by multiplying the tax base, i.e. the affected goods trade flow with the corresponding VAT rate of the importing country at a sufficiently detailed product level before aggregation. It does not come as a surprise that the pattern of the most sizable VAT payments is closely related to the one of the biggest trade flows as reported above despite the variation in country specific VAT rates. Dutch firms would charge VAT of about 20 bn EUR for exports to Germany which would be payable to the German tax authorities. The second largest transfer would be from German firms to the French tax authorities which would amount to about 15 bn EUR (16 bn EUR using export data). In total, VAT payments amounting to 506 bn EUR (511 bn EUR using export data) would be transferred between all member states. The 20 biggest VAT payments would be collected by Germany (import data: 97 bn EUR, export data: 100 bn EUR), France (import data: 58 bn EUR, export data: 60 bn EUR), followed by Belgium, Italy, the Netherlands and the United Kingdom who would all collect VAT of around 40 bn EUR from other member states' firms. VAT payments sent to all the other member states would be highest for Germany (117 bn EUR) followed by the Netherlands (import data: 62 bn EUR, export data: 63 bn EUR) and France (45 bn EUR). Given the tendency of overestimation, those figures have to be interpreted as upper bounds.

Variations in country-pair specific effective VAT rates are summarized in Table 2.7 and Table 2.8 which show VAT payments from Table 2.5 and Table 2.6 divided by affected trade flows as reported in Table 2.3 and Table 2.4. The first observation is that these effective VAT rates are only slightly lower than the standard rates. The unweighted average of the difference of the standard rate to the effective rate over all member states is 1.56 percent-points, which implies that reduced rated product groups have a rather small share in affected trade. This share amounts to 12.2 percent (12.5 percent using export data) for the EU27 implying that about 88 percent of affected trade are subject to the respective standard rates. There are country specific differences concerning this absolute difference in

standard and effective rate. While for Bulgaria and Denmark¹² this difference is non-existing it is largest for Greece (import data: 4.08 percentage-points, export data: 3.73 percentage-points) and Portugal (import data: 2.91 percentage-points, export data: 2.92 percentage-points) who have disproportionately high imports in reduced rate categories. Comparing the effective rate of a country-pair with the average effective rate of an importing country reveals exporters with disproportionately high concentration of their exports in categories that are reduced rated in the importing countries. Those are Cyprus, Denmark, Greece, Ireland and Malta. The remaining part of this section contains a more thorough analysis on the product structure for some representative member states.

¹² Bulgaria and Denmark virtually use only a single rate. Exceptions such as for the trade in works of art and antiques in Denmark have no quantitative significance.

Table 2.5 Potential bilateral VAT payments for goods trade 2011, in million EUR, import data

		Destination													
		AT	BE	BG	CY	CZ	DK	EE	FI	FR	DE	EL	HU	IE	IT
Source	AT	-	377	157	6	953	156	19	150	930	7 149	84	1 272	41	1 783
	BE	507	-	79	24	560	546	45	404	9 688	9 978	258	303	276	2 618
	BG	68	218	-	3	32	21	1	7	123	360	234	53	1	408
	CY	8	16	16	-	8	7	1	1	10	46	128	15	-	17
	CZ	979	594	81	5	-	207	32	152	1 185	6 622	45	662	62	983
	DK	101	194	18	5	129	-	39	369	479	2 135	73	108	134	344
	EE	7	26	1	-	13	58	-	374	34	94	1	5	1	31
	FI	81	327	12	3	60	293	315	-	328	1 185	45	87	25	283
	FR	737	6 242	140	54	664	535	41	384	-	10 222	366	618	365	5 854
	DE	10 875	9 015	507	78	6 446	3 477	253	1 859	15 335	-	856	4 602	814	11 711
	EL	27	63	261	204	21	31	1	43	112	306	-	22	8	341
	HU	747	2 220	141	3	555	130	31	41	626	3 377	46	-	25	654
	IE	86	2 420	15	2	130	187	6	111	847	1 256	47	84	-	452
	IT	1 702	1 673	331	84	824	594	55	333	6 765	8 567	828	860	153	-
	LV	5	17	3	-	12	77	265	104	23	119	2	6	3	19
	LT	10	52	8	-	23	93	197	58	190	303	3	19	12	52
	LU	75	393	3	-	41	31	2	16	383	669	21	18	15	171
	MT	2	14	3	1	5	3	-	-	51	55	14	2	2	44
	NL	991	12 538	119	37	1 244	1 209	89	949	6 290	20 027	423	783	581	3 713
	PL	421	632	89	6	1 565	524	168	233	1 452	6 117	68	892	53	1 422
	PT	52	297	10	3	62	73	2	59	902	865	24	35	24	300
	RO	195	120	323	3	138	34	4	18	539	1 409	97	627	18	1 061
	SK	753	157	56	3	1 567	75	5	36	562	2 120	27	1 053	7	566
	SI	301	36	32	1	117	45	4	15	251	848	32	200	3	453
	ES	314	1 221	248	30	315	247	16	142	5 576	3 820	267	222	129	3 203
	SE	281	1 305	29	6	216	2 269	265	1 874	1 089	2 620	58	182	104	668
	UK	376	3 921	72	89	529	1 007	87	404	4 195	7 000	223	358	3 891	2 003
	Sum	19 703	42 089	2 755	649	16 227	11 928	1 944	8 136	57 966	97 272	4 269	13 089	6 747	39 150

Source: EUROSTAT, ComExt database and own calculations. Note: Column sums represent total per country payments received, while row sums represent payments sent.

		Destination														Sum
		LV	LT	LU	MT	NL	PL	PT	RO	SK	SI	ES	SE	UK		
Source	AT	27	32	17	4	364	762	68	504	664	475	432	324	639	17 389	
	BE	39	144	795	7	6 619	937	296	245	146	74	1 574	1 075	3 939	41 177	
	BG	3	6	-	14	50	65	8	371	21	26	63	22	60	2 240	
	CY	7	1	1	-	21	14	1	17	11	15	2	6	18	389	
	CZ	35	57	18	2	1 072	1 353	82	319	2 037	114	505	390	946	18 540	
	DK	51	76	6	7	573	353	48	86	52	11	383	2 233	1 001	9 007	
	EE	175	131	-	-	86	37	2	3	3	1	18	532	49	1 684	
	FI	106	99	3	1	805	315	33	42	31	18	213	1 596	518	6 822	
	FR	75	106	239	59	3 021	1 299	779	723	389	202	5 654	1 329	4 564	44 662	
	DE	283	459	712	40	11 247	8 990	1 566	2 189	2 113	786	6 714	5 416	10 798	117 141	
	EL	2	3	-	11	71	40	21	140	11	30	102	31	99	2 003	
	HU	23	28	11	-	369	579	57	1 074	772	164	355	191	686	10 905	
	IE	5	11	12	1	805	136	89	62	27	6	542	501	2 238	10 078	
	IT	108	152	54	217	1 444	1 735	688	1 442	451	773	3 714	862	2 845	37 254	
	LV	-	303	-	-	114	60	1	6	17	1	25	122	88	1 390	
	LT	403	-	1	0	277	220	12	13	11	2	52	168	122	2 301	
	LU	2	3	-	-	145	112	12	12	21	13	123	66	201	2 548	
	MT	-	-	-	-	9	3	3	2	2	-	16	2	31	265	
	NL	85	231	164	14	-	1 677	535	392	251	124	2 440	1 642	5 555	62 105	
	PL	183	425	24	3	986	-	84	515	617	86	650	841	1 425	19 481	
	PT	2	4	4	3	310	64	-	55	20	5	1 895	112	366	5 549	
	RO	4	7	1	2	195	197	25	-	115	40	162	71	287	5 693	
	SK	18	21	7	1	277	839	25	225	-	65	213	221	334	9 230	
	SI	6	7	2	1	56	127	7	76	170	-	45	44	80	2 958	
	ES	28	51	19	24	1 140	584	3 783	300	105	85	-	349	2 149	24 366	
	SE	92	154	12	22	1 286	740	99	78	72	25	528	-	1 711	15 783	
	UK	78	75	41	46	4 748	828	397	280	153	59	2 163	1 679	-	34 702	
	Sum	1 841	2 584	2 146	481	36 089	22 068	8 720	9 170	8 282	3 200	28 584	19 825	40 747	505 660	

Table 2.6 Potential bilateral VAT payments for goods trade 2011, in million EUR, export data

		Destination													
		AT	BE	BG	CY	CZ	DK	EE	FI	FR	DE	EL	HU	IE	IT
Source	AT	-	333	128	12	985	155	19	104	930	7 107	89	1 048	48	1 642
	BE	628	-	78	36	564	614	51	448	9 457	11 107	270	336	384	2 719
	BG	72	200	-	7	43	29	2	7	137	431	289	59	2	342
	CY	1	1	2	-	2	1	-	-	2	11	61	-	-	7
	CZ	1 030	588	82	11	-	225	35	157	1 203	7 020	63	695	61	960
	DK	101	198	14	6	152	-	34	371	494	2 148	69	102	143	360
	EE	9	29	3	1	10	76	-	417	61	99	1	7	2	38
	FI	80	300	9	2	52	245	249	-	306	966	31	63	24	249
	FR	730	5 405	125	58	661	616	48	380	-	10 605	458	632	431	6 035
	DE	10 854	8 220	474	114	6 080	3 645	306	1 894	15 589	-	965	4 141	927	11 528
	EL	35	52	245	206	21	31	1	35	96	282	-	27	5	353
	HU	850	222	142	6	601	135	28	47	671	3 663	54	-	32	733
	IE	49	1 548	11	3	85	114	4	66	664	1 052	45	46	-	431
	IT	1 649	1 706	315	103	836	581	75	347	7 507	8 788	983	902	199	-
	LV	6	18	3	5	18	71	225	60	23	129	2	7	4	25
	LT	11	42	8	1	26	107	256	60	141	330	3	21	13	59
	LU	50	336	2	4	24	25	2	20	439	624	18	14	22	175
	MT	1	1	1	1	1	2	-	1	42	53	40	1	2	31
	NL	1 136	11 708	129	62	1 373	1 443	77	999	6 792	20 105	436	783	551	3 374
	PL	501	623	86	17	1 707	599	151	227	1 506	6 387	93	909	75	1 375
	PT	46	266	12	5	59	66	3	54	970	1 089	32	32	28	298
	RO	189	161	326	9	156	42	7	25	621	1 504	125	677	19	1 140
	SK	794	190	76	10	1 703	96	7	42	705	2 175	34	1 136	15	563
	SI	354	49	39	14	138	50	5	12	272	938	13	248	4	533
	ES	367	1 174	239	36	327	303	21	165	6 457	3 872	322	270	148	3 187
	SE	229	1 158	23	8	182	2 054	236	1 843	1 027	2 397	67	142	137	623
	UK	362	3 526	72	120	436	791	59	402	4 192	6 659	234	293	3 959	2 107
	Sum	20 135	38 057	2 644	857	16 242	12 116	1 901	8 182	60 302	99 544	4 797	12 593	7 237	38 888

Source: EUROSTAT, ComExt database and own calculations. Note: Column sums represent total per country payments received, while row sums represent payments sent.

		Destination													
		LV	LT	LU	MT	NL	PL	PT	RO	SK	SI	ES	SE	UK	Sum
Source	AT	24	31	23	5	371	772	68	449	652	400	389	317	697	16 797
	BE	40	160	767	14	7 565	1 114	336	227	164	87	1 578	1 051	4 341	44 135
	BG	4	5	3	5	48	75	8	455	22	17	73	23	64	2 422
	CY	-	-	-	-	2	-	-	2	1	-	1	3	17	115
	CZ	34	62	19	5	837	1 610	89	304	2 054	113	512	473	1 031	19 273
	DK	42	71	6	4	669	365	50	60	51	11	307	2 207	1 100	9 136
	EE	199	112	-	-	61	41	2	3	4	1	33	459	46	1 713
	FI	90	66	2	1	770	315	32	34	20	16	175	1 497	476	6 073
	FR	48	89	230	54	3 104	1 378	770	673	385	194	5 426	1 317	4 701	44 552
	DE	273	443	773	49	11 701	9 300	1 499	2 055	2 052	742	6 712	5 171	11 826	117 334
	EL	2	4	2	9	64	44	23	141	12	27	78	25	126	1 947
	HU	26	29	10	2	372	623	56	1 081	937	152	432	192	697	11 794
	IE	9	4	8	1	382	106	62	67	10	4	474	141	2 116	7 500
	IT	78	153	64	213	1 612	2 034	693	1 432	473	751	3 827	894	3 002	39 217
	LV	-	312	-	1	36	110	1	6	6	1	10	129	51	1 258
	LT	406	-	1	0	234	282	10	11	9	2	45	171	142	2 388
	LU	1	4	-	-	125	63	8	11	9	8	56	86	216	2 340
	MT	-	-	-	-	4	2	2	1	-	-	3	2	15	206
	NL	84	154	215	26	-	1 830	583	397	275	138	2 423	1 893	5 613	62 601
	PL	171	390	29	2	1 087	-	99	492	661	85	638	899	1 537	20 348
	PT	3	5	7	4	328	87	-	55	17	5	2 012	108	408	6 001
	RO	5	7	2	8	225	240	37	-	143	40	194	88	278	6 271
	SK	24	22	11	2	279	942	32	268	-	82	245	247	386	10 089
	SI	4	8	5	-	92	166	11	80	192	-	50	54	97	3 427
	ES	25	46	27	33	1 088	705	3 572	330	122	83	-	448	2 367	25 732
	SE	85	121	15	5	1 310	725	95	59	55	21	449	-	1 768	14 835
	UK	53	59	42	61	5 008	989	390	234	119	49	1 809	1 551	-	33 576
	Sum	1 727	2 359	2 261	506	37 374	23 918	8 528	8 927	8 444	3 029	27 952	19 448	43 116	511 080

Figure 2.1 provides an overview of the goods structure of the intra-EU27 imports summed over all Member States while Figure 2.2 to Figure 2.9 provide a closer look at the goods structure of the imports for a selection of countries. They illustrate the biggest potential VAT payments received, i.e. related to the intra-EU imports, per HS2 category sorted by size and aggregated over all partner countries. HS2 categorizes goods trade into 97 different product groups. The figures show the 20 largest categories for every presented country. The patterns look very similar for the majority of the member states although there are some country-specific peculiarities which we will discuss below. Trade is very concentrated on a few of the 97 groups. Looking at the EU27-average reveals that around 50 percent of intra-EU goods imports falls into only 6 product groups. The 19 biggest groups cover already 75 percent. The 6 dominant categories are: *boilers, machinery and mechanical appliances* (84), *vehicles other than railway* (87), *electrical machinery* (85), *mineral fuels and oils* (27), *plastics* (39) and *iron and steel* (72).

A general observation is that there does not seem to be a systematic pattern concerning the differences between import and export data measured trade and VAT flows which would fit our suggested line of argumentation. For example, category 84 (*boilers, machinery and mechanical appliances, etc.*) should be dominated by industrial products, hence the “non-identified B2C transactions”-bias should be small¹³ while the “CIF instead of FOB valuation”-bias can be expected to be sizable. Hence, one would expect that the flows measured using import data should exceed those based on export data. However, for 15 out of 27 country exactly the opposite is true. Apparently, a significant share of the difference between export and import data cannot be explained by the two named bias factors (see Gehlhar, 1996).

We now present the results for some representative countries. Figure 2.2 shows the 20 categories for which Germany would receive the biggest VAT payments, i.e. the payments which are related to the imports to Germany. Goods in category 84 which comprises mostly sophisticated machinery are imported most. This is true for many member states. We will later group and discuss countries that differ in that respect. Possible VAT payments for this single product group amount to 12.9 (import data) to 13.4 (export data) bn EUR. Germany’s import structure is dominated by groups which mainly include industrial goods, which is to be expected given the production structure. According to Eurostat’s NACE-level data from the Structural business statistics for 2010 manufacturing (NACE C) had a share in the value added of total business activity of 35 percent compared to 27 percent for the EU27. In contrast, Greece receives relatively higher VAT payments for the imports of consumer products like *footwear and clothing* (61, 62 and 94) or *meat* (02). A representation of Greece’s structure of VAT payments received is provided in Figure 2.3. The figure also shows that VAT payments for category 27 (mineral fuels and oils, etc.) computed using import data are much lower compared to using export data. This particular deviation is due to a single discrepancy in category 271019 classifying specific *petroleum oils and related preparations*¹⁴. As neighbouring categories for products of very similar nature do not show this deviation nor does this category for other country

¹³ This category does include some consumer products like refrigerators or dishwashing machines which, however, are hardly shipped directly to consumers abroad.

¹⁴ The full name of category 271019 is “petroleum oils and oils obtained from bituminous minerals (excl. Crude); preparations containing ≥ 70 % by weight of petroleum oils or of oils obtained from bituminous minerals, these oils being the basic constituents of the preparations n.e.s.”

pairs, it is likely that it is simply due to measurement error. Category 27 is by a far margin the group with the most sizeable differences between import and export data. Next to Greece big differences can also be found for Belgium, France, Hungary, Italy, Luxembourg, Portugal and Slovenia. However, there does not seem to be a systematic reason why import and export data differ in this category. First, while for Greece and Luxembourg the export data recorded flow exceeds the one computed using import data, it is the other way around for the other mentioned countries. Second, deviations occur in different subcategories. While it is specific *petroleum oils and related preparations* (2710) for Greece and Portugal and crude mineral oil for Belgium (2709), the explanation for discrepancies for Italy, Hungary, Luxembourg and Slovenia is mainly given by diverging data for *electrical energy* (2716). In contrast, the main reason for deviations for France is the difference in the data for *natural gas in gaseous state* (271121). Figure 2.4 illustrates the received VAT payments structure for France. As conclusion, there does not seem to be a reason why measuring energy trade using export data versus import data should be systematically distorted in a particular way. It seems more likely that discrepancies for this category are rather random due to its nature and the principle difficulty of being measured accurately.

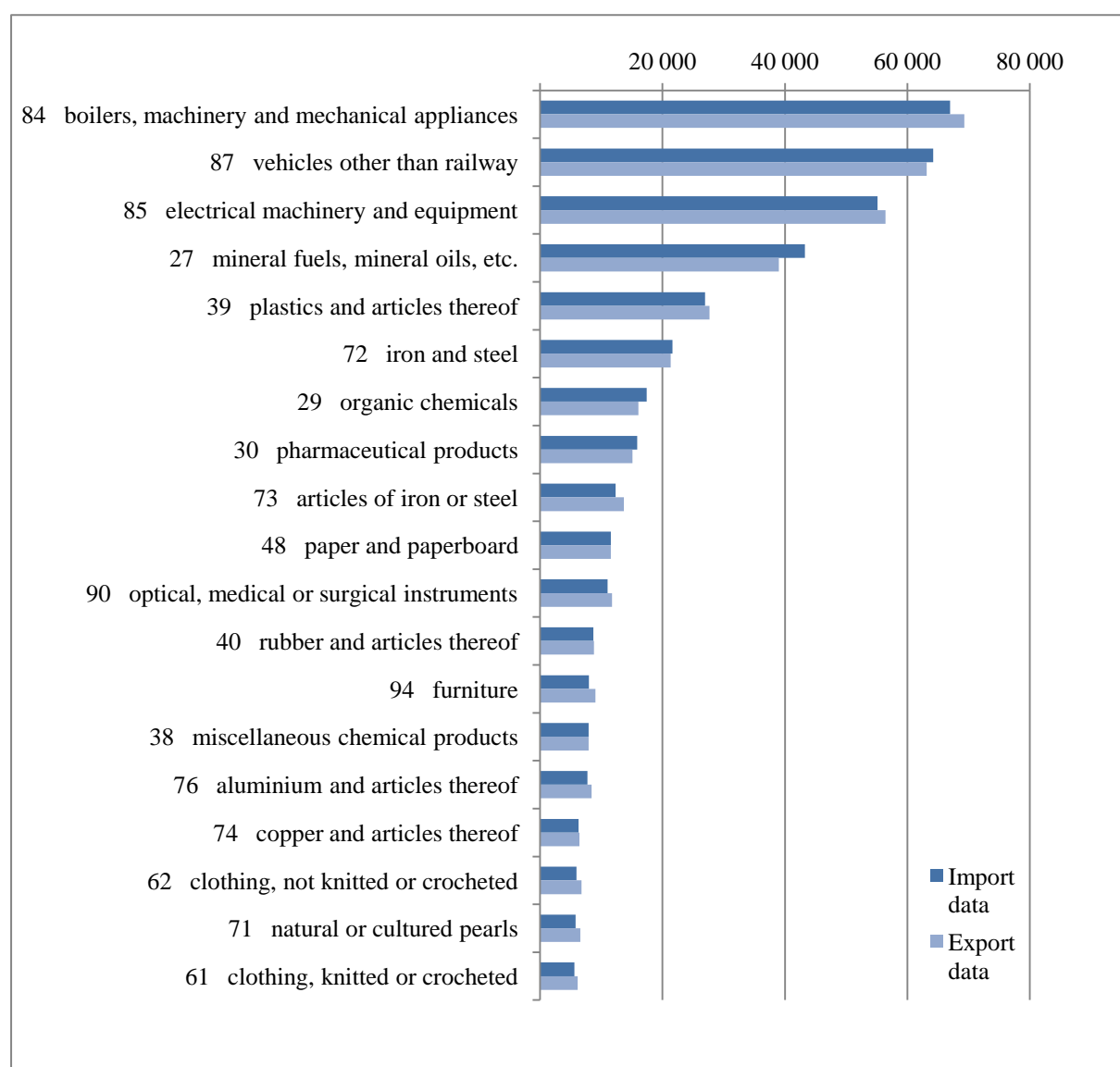
With the exception of the energy category 27 big deviations are very rare. There are two further noteworthy data inconsistencies. First, there are some significant differences between import and export data for Cyprus for several categories. However, due to its size aggregate results for the European Union as a whole are only negligibly distorted. Second, category 99 (*other products*) for Ireland shows large differences with VAT payments according to import data exceeding those computed using export data by a factor of 14. It seems that most products recorded by the Irish statistical authorities in this category were differently classified by the counter parties recording the exports to Ireland instead of being missing. In fact, VAT payments according to export data even exceed the payments based on import data in total. Figure 2.5 and Figure 2.6 illustrate the structures for Cyprus and Ireland.

As argued above the principle import structure is very similar for most of the countries and differences are rather limited. In contrast to Germany or the EU27 as a whole, the highest VAT payments received by the Netherlands and Belgium do not stem from *boilers, machinery and mechanical appliances* (84) but from *mineral fuels and oils, etc.* (27). Figure 2.7 illustrates the data for the Netherlands. Possible cross-border VAT payments received for imports mineral fuels and oils, etc. amount to 6.1 bn EUR (export data: 6.8 bn EUR). For Belgium these figures amount to 8.1 bn EUR (export data: 6.5 bn EUR). Import of big amounts of mineral oil is facilitated by two of the biggest ports in Europe: Rotterdam and Antwerp. Mineral oil shipments to the Netherlands mainly come from the United Kingdom, while Belgium receives a majority from the Netherlands. Next to those two countries, *mineral fuels and oils, etc.* (27) are also the most important import category for Cyprus, Ireland, Luxembourg (export data only), Malta and Slovenia (import data only).

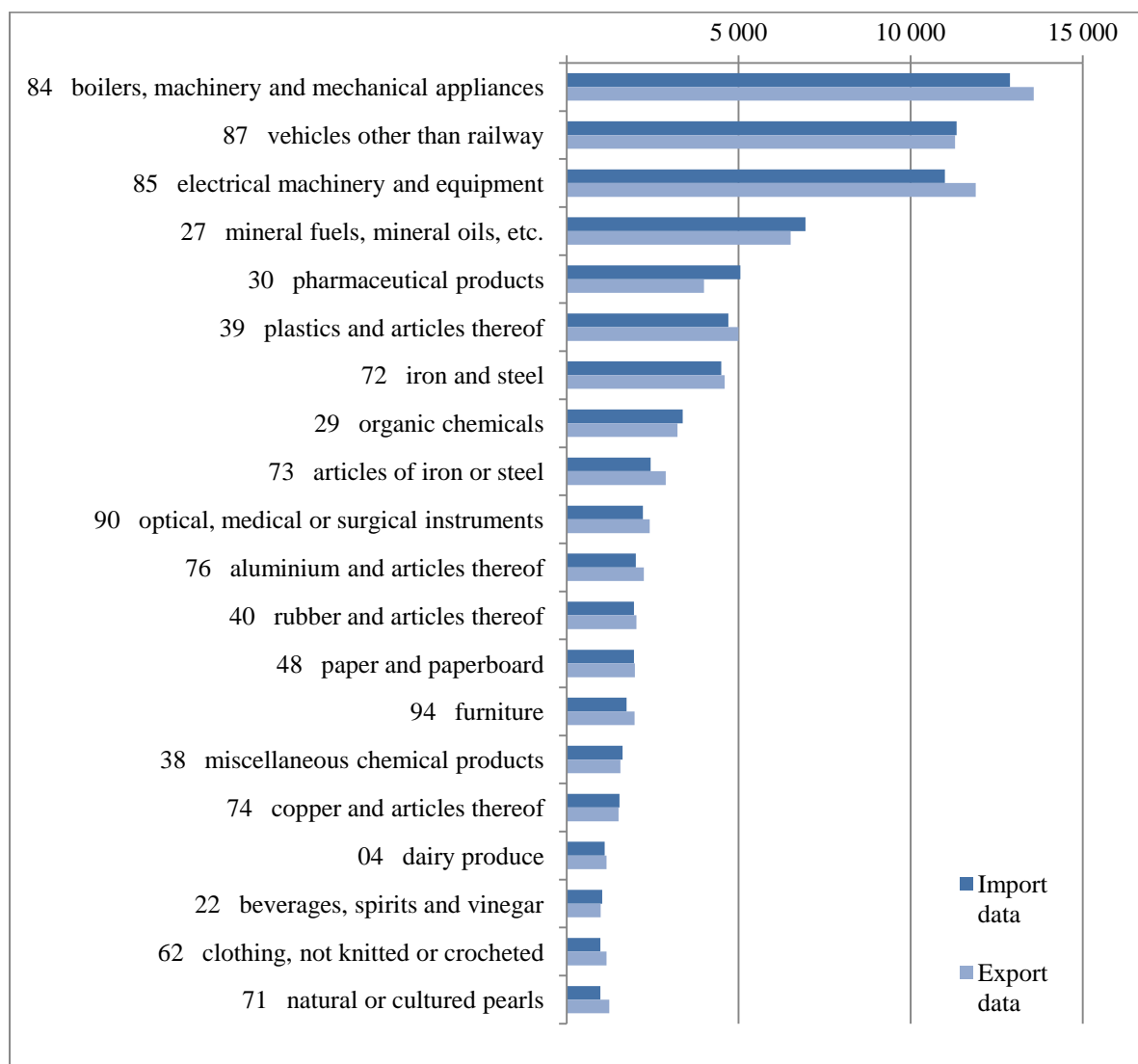
A third group of countries is given by the member states for which *vehicles other than railway* (87) are the biggest import category. Those countries are Italy, Lithuania, Luxembourg (import data only), Portugal, Spain (import data only) and the United Kingdom. As a representative country data the United Kingdom is shown in Figure 2.8. According to the Structural business statistics for 2010 from Eurostat the share of value added in motorcar manufacturing (NACE C29) in total business activity in

the United Kingdom is about half of the average value for the EU27 (1.2 percent vs. 2.4 percent) which explains the disproportionately large supplies from other member states, in particular from Germany. A fourth group can be characterized for which *electrical machinery and equipment* (85) is the most important import category. Bulgaria, which is shown in Figure 2.9, Estonia, Greece, Hungary, Romania and Slovakia share this characteristic. Those are countries that typically have an above average share of value added in low-technology manufacturing (NACE C_LTC) compared to the EU27.

Figure 2.1 20 biggest VAT payments (received) per HS2 category in million EUR for EU27

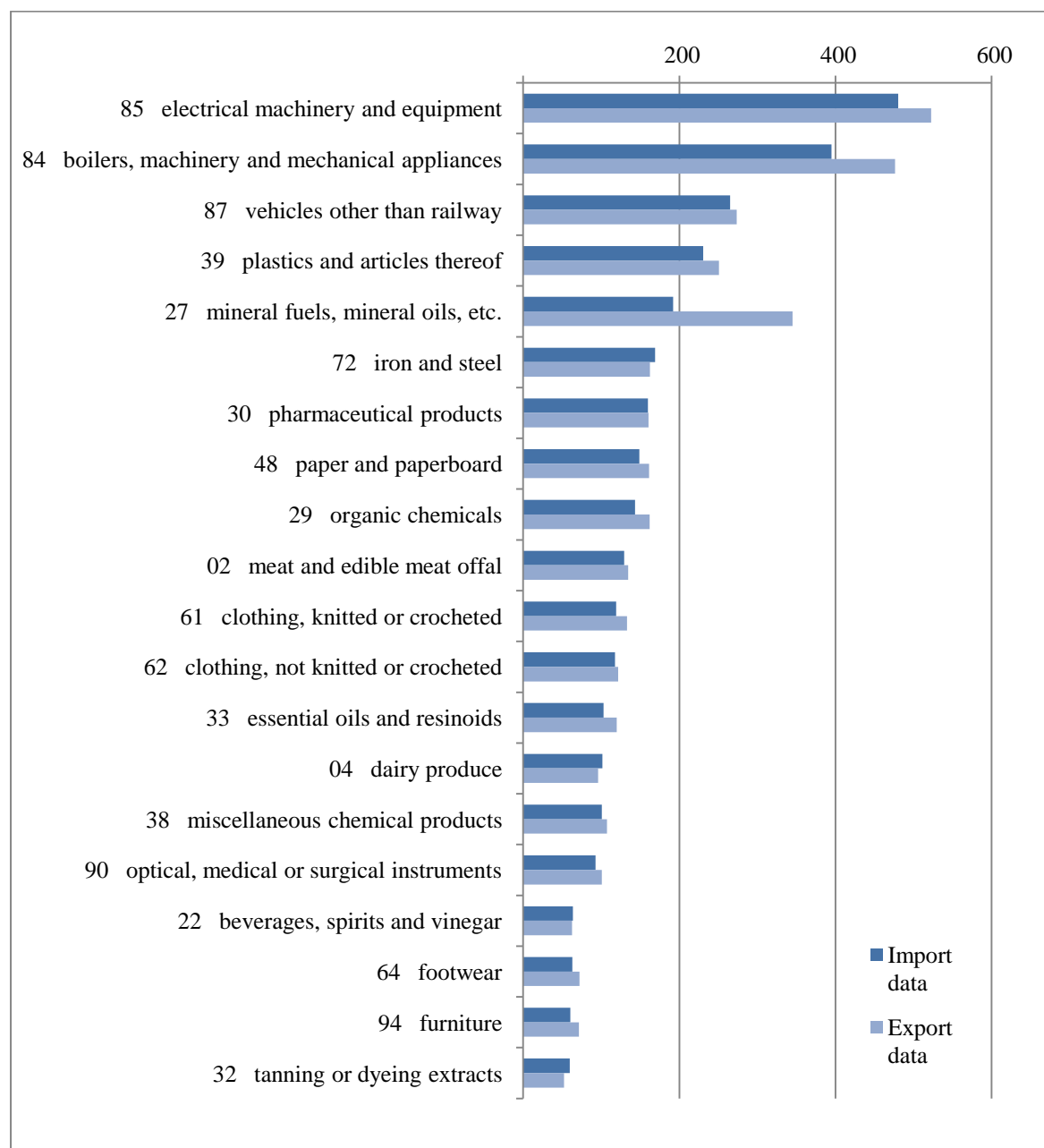


Source: EUROSTAT, ComExt database and own calculations.

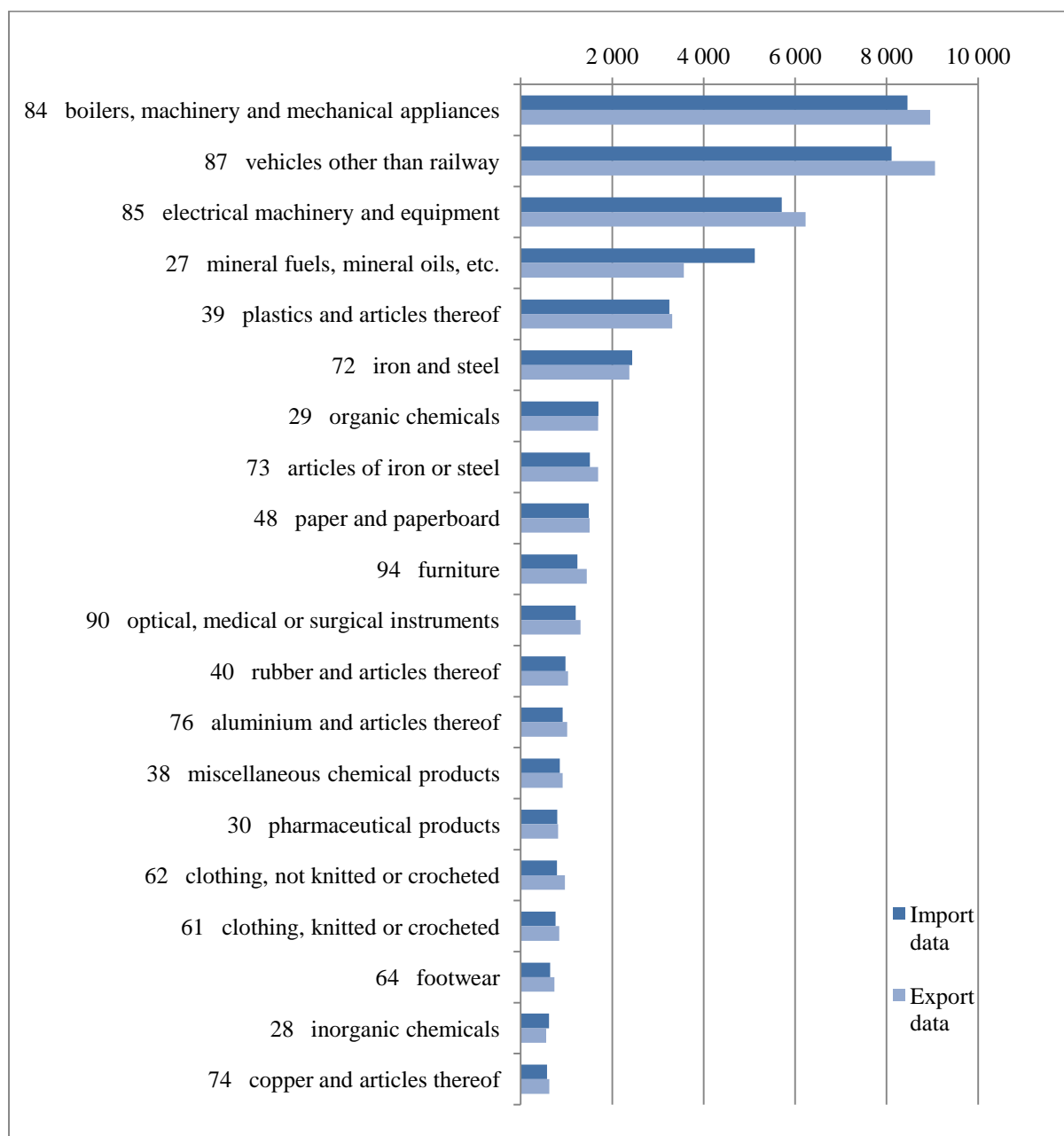
Figure 2.2 20 biggest VAT payments (received) per HS2 category in million EUR for Germany

Source: EUROSTAT, ComExt database and own calculations.

Figure 2.3 20 biggest VAT payments (received) per HS2 category in million EUR for Greece

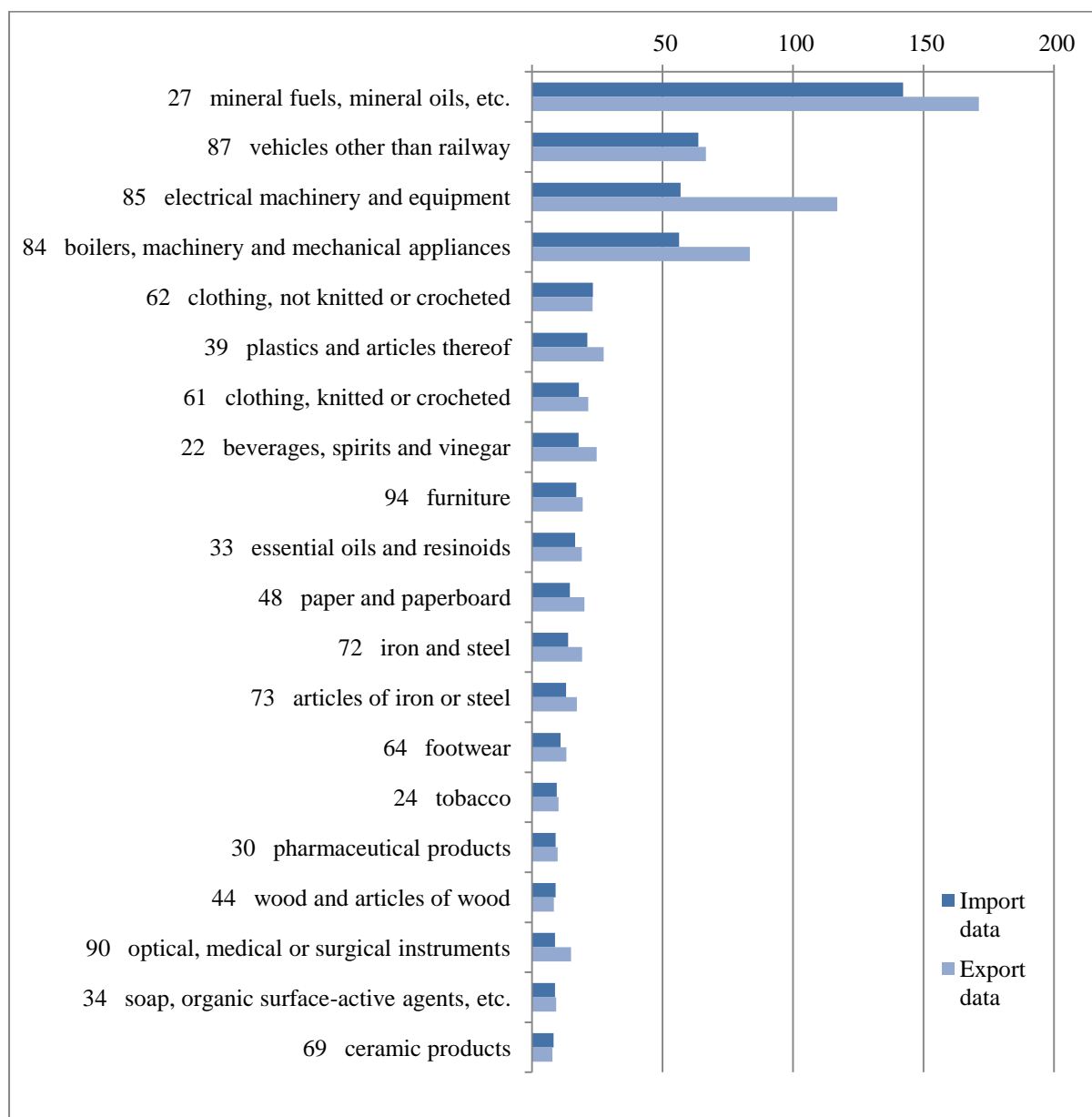


Source: EUROSTAT, ComExt database and own calculations.

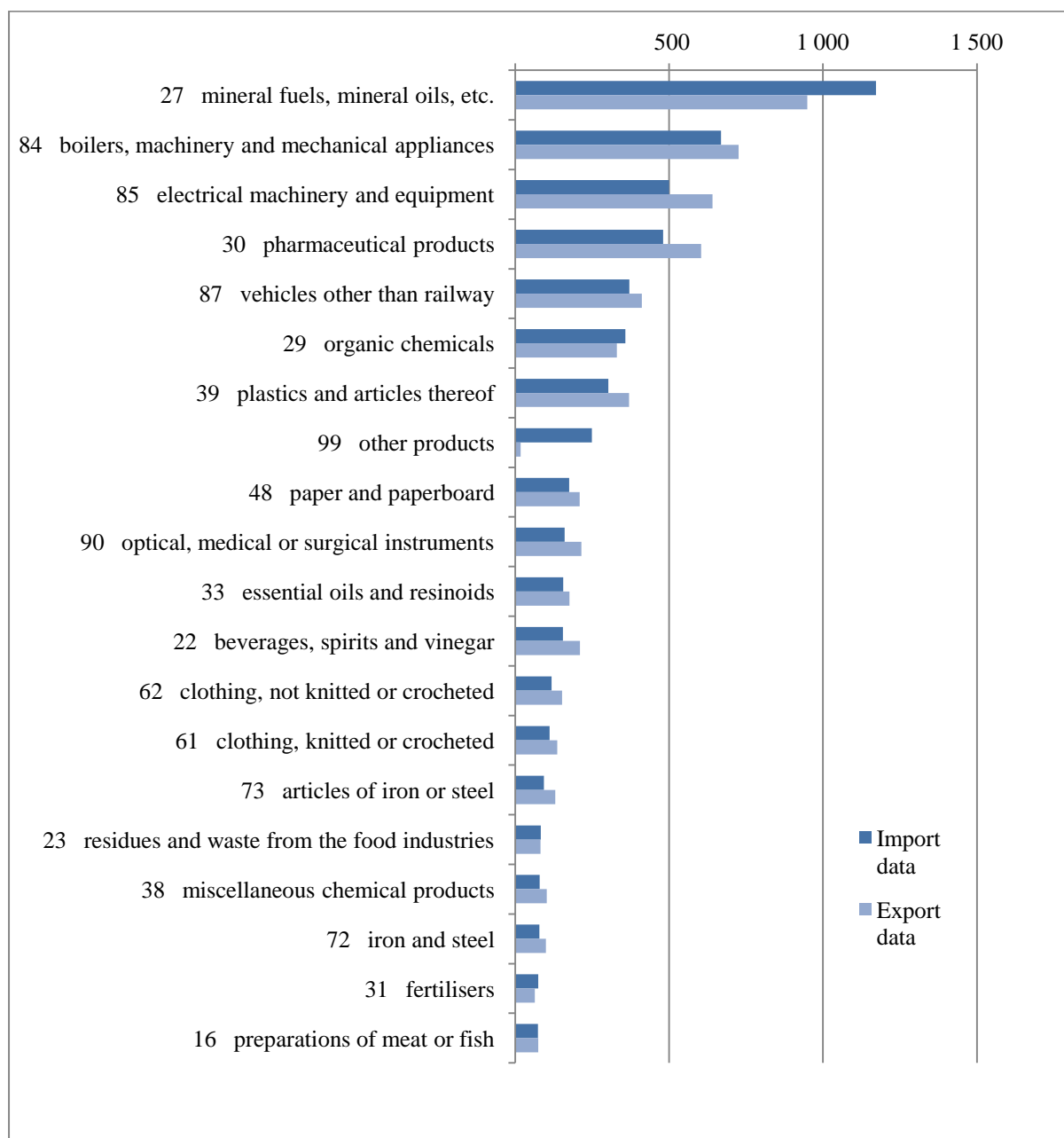
Figure 2.4 20 biggest VAT payments (received) per HS2 category in million EUR for France

Source: EUROSTAT, ComExt database and own calculations.

Figure 2.5 20 biggest VAT payments (received) per HS2 category in million EUR for Cyprus

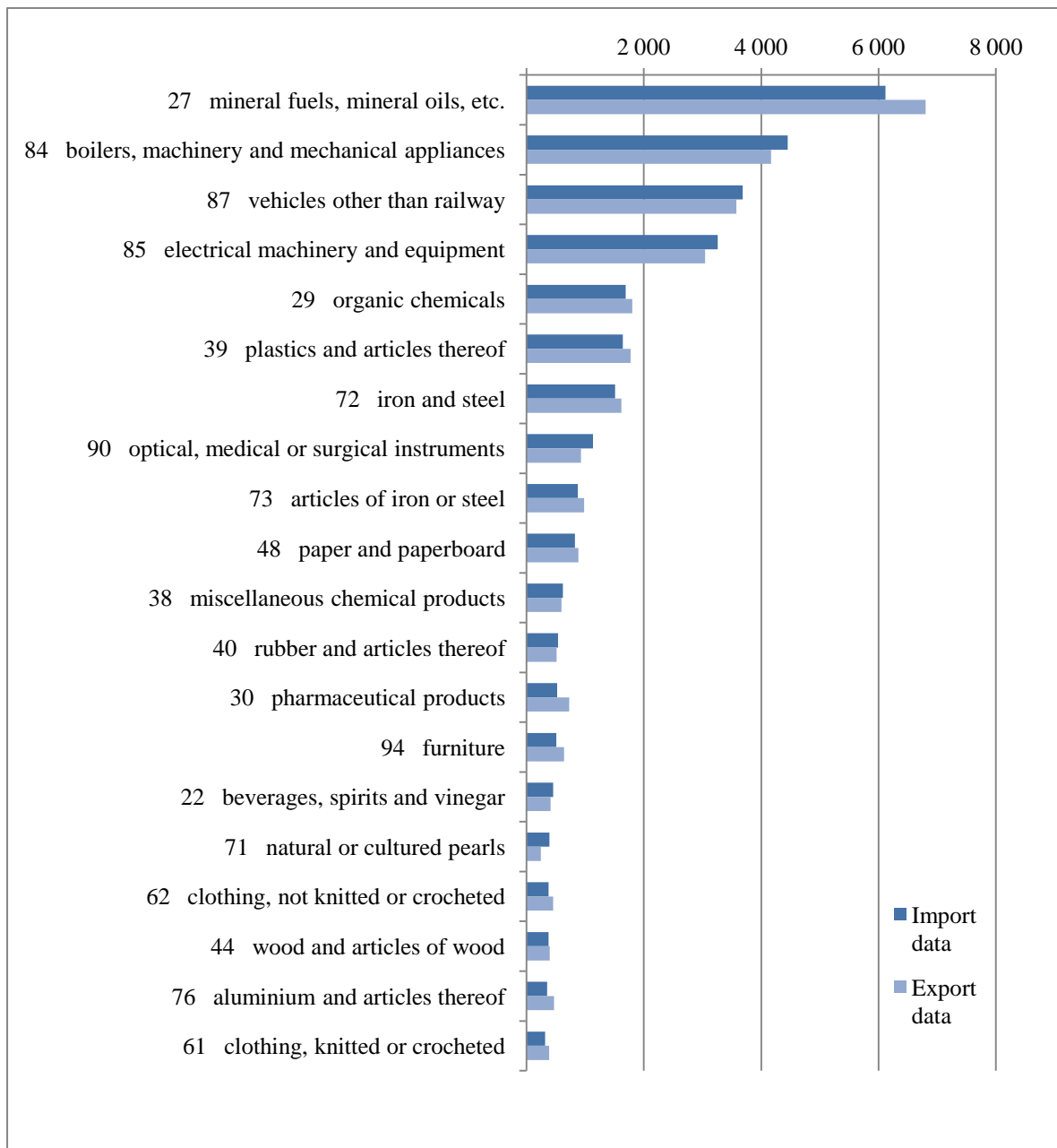


Source: EUROSTAT, ComExt database and own calculations.

Figure 2.6 20 biggest VAT payments (received) per HS2 category in million EUR for Ireland

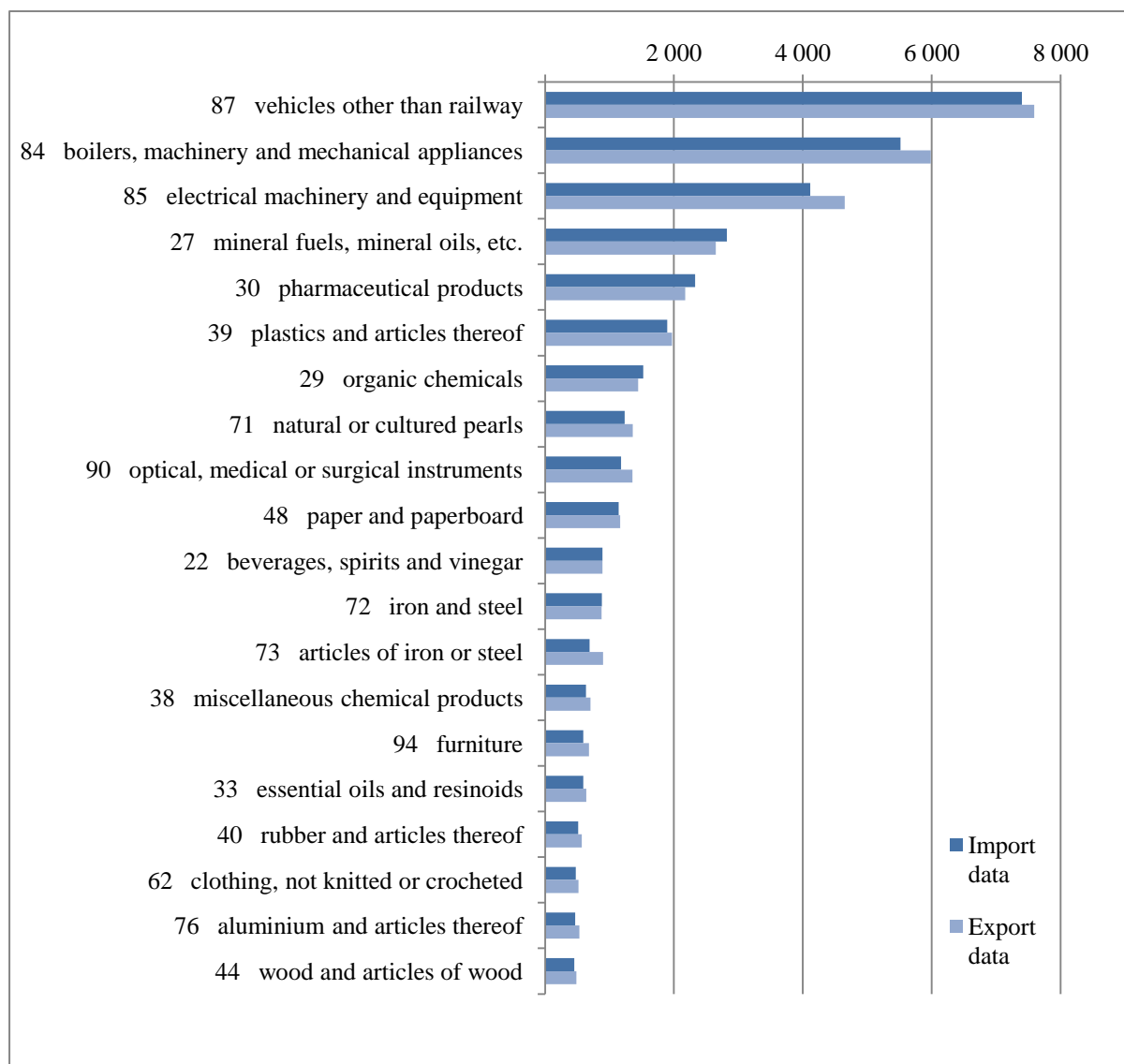
Source: EUROSTAT, ComExt database and own calculations.

Figure 2.7 20 biggest VAT payments (received) per HS2 category in million EUR for the Netherlands



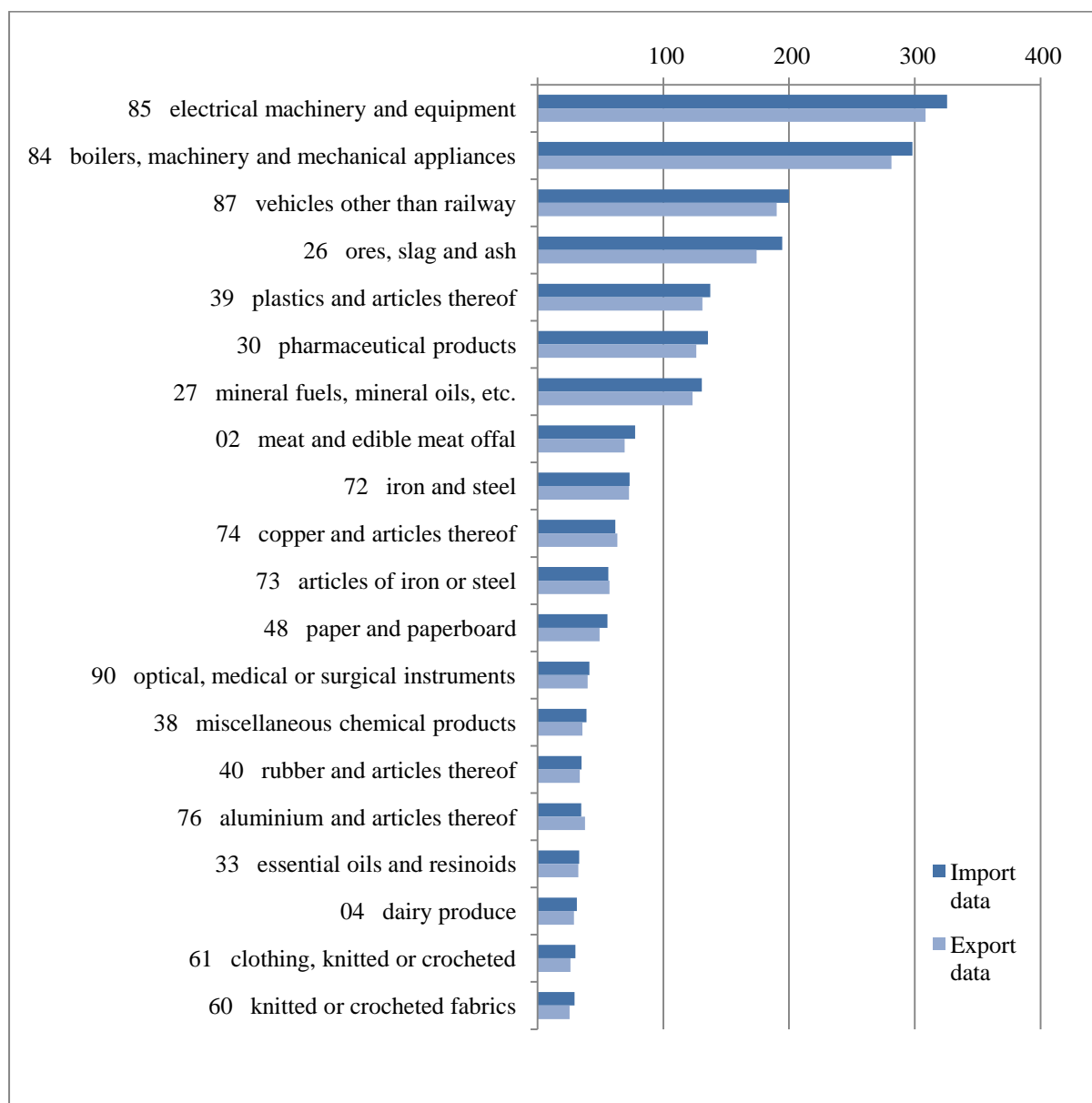
Source: EUROSTAT, ComExt database and own calculations.

Figure 2.8 20 biggest VAT payments (received) per HS2 category in million EUR for the United Kingdom



Source: EUROSTAT, ComExt database and own calculations.

Figure 2.9 20 biggest VAT payments (received) per HS2 category in million EUR for Bulgaria



Source: EUROSTAT, ComExt database and own calculations.

3 Value added tax on bilateral trade in services

This section carries out a similar analysis like done in section 2 but for services trade. The task is to provide an estimate of the total value of intra-EU transactions in services on which no VAT is charged by the supplier and the VAT is reverse charged according to articles 194 and 196.¹⁵ Further, the task involves calculating an estimate of the VAT payments paid by the purchaser of the identified services. The analysis differs from section 2 in two ways. First, a different data source has to be used and second, a much lower share of services is subject to reverse charge. In principle the supply of services to taxable persons (B2B) is taxed at the customer's place of establishment using the reverse charge mechanism, while the supply to non-taxable persons (B2C) is taxed at the supplier's place of establishment. However, there are many exceptions to the general rule (Article 44) that change the place of taxation which has to be taken into account.

3.1 Data source

Bilateral trade data of services provide much less detail than data of goods trade, although services trade takes up about a quarter of total trade within the EU. The main methodological references used for the production of statistics on international trade in services are the International Monetary Fund (IMF) fifth balance of payments manual (BPM5) and the United Nations' manual on statistics of international trade in services (MSIT 2002).¹⁶ Data on international trade in services provided by Eurostat is geographically allocated according to the residence of the trading partner, distinguishing between intra-EU transactions and extra-EU transactions. The data is collected from different sources as banks, national banks and questionnaires. The breakdown of Eurostat statistics on international trade in services includes three main sub-items: transport, travel, and other services:

1. All modes of transport are considered including sea, air, space, rail, road, inland waterway, and pipelines, as are other supporting and auxiliary services (such as storage and warehousing).
2. Travel covers primarily the goods and services acquired by travellers.
3. Other services comprise: communications services, construction services, insurance services, financial services, computer and information services, royalties and license fees, other business services, personal, cultural and recreational services, and government services.

We use the available data in its fullest detail, i.e. broken down to 60 services types.¹⁷ The latest year available of the breakdown in sub-items is 2011 for which we report the values again using import as well as export data¹⁸. The symmetry in the sense that country A's imports vis-à-vis country B have to (theoretically) equal country B's exports vis-à-vis country A is subject to a few exceptions as discussed below. The database for services is not only much less detailed but also subject to more

¹⁵ Note that Article 199 in addition specifically permits Member States to reverse charge certain B2B supplies, such as construction work. Our estimations consequently also include the abolishment of these reverse charged supplies.

¹⁶ New standards, i.e. BPM6 and MSIT 2010 have been released. However, the available data is still compiled according to the old standards mentioned above.

¹⁷ We used the extended transportation positions and eliminate the regular ones.

¹⁸ Although in the balance of payments items are recorded as "debit" or "credit" positions we will refer them as imports (debit) or exports (credit) to ease the readability of the report.

measurement error, e.g. the discrepancy between export data of a reporting country and the import data of its partner country can be substantial. Values are usually reported as rounded to the nearest million. We carry out the analysis using both, import and export data, and highlight remarkable differences throughout the analysis.

3.2 Methodology

The method resembles the one used for the analysis of goods trade although we had to carry out some additional steps. The first was related to the preparation of the data. A particular problem which does not occur in ComExt is that of missing entries, e.g. due to confidentiality. As mentioned before the data consists of 60 services categories. In addition intermediate aggregates are reported that group some of those 60 categories. In many cases only those aggregates or only a part of the 60 service groups hold values. In order to work with a complete and consistent (with respect to aggregation of service groups) data set we imputed the missing observations using a procedure described in full detail in annex 3. Given that missing observations occur very systematically for every reporting country, i.e. all partner countries and years are affected, we had to use information of other reporting member states. This is done by computing weights from the available data for sublevel services categories at every corresponding intermediate aggregate data point which are used to split the intermediate aggregate to their subcategories for countries where only the former is known. Note that the bias in the results compared to an ideal setting in which all missing values are known only exists if different VAT rates have to be applied to those sublevel service categories or if some of those services groups have to be excluded from the analysis and others not. As an indication of the size of the potential bias we summed the reported services trade of all categories and every country pair which hold subcategories for which data is missing although they have to be treated differently (either because of exclusion or varying VAT rates). This gives us a very conservative bound¹⁹ on the potential bias. We computed that the potential bias cannot be larger than 4.9 percent (or 6.6 percent using export data) of total goods and services trade.

After the preparation of the data we flagged every of the 60 service groups with respect to whether they were to be included in the analysis or not and if yes we attached the corresponding VAT rate. The exclusion of particular service groups is now described in more detail and summarised in Table 3.1. As only a share of the services is subject to the existing reverse charge system we had to filter the categories which are not. First, while all freight and auxiliary transport services are included we excluded passenger transport for all modes. The balance of payments (BoP) statistics cover all international passenger transport services for non-residents provided by resident carriers and for residents carried out by non-resident carriers. Domestic services by resident carriers to non-residents

¹⁹ The bound is conservative for two reasons. First, often values are missing only for some and not all subcategories belonging to a specific parent category. However, in that case we always took the total value of the parent category to compute the potential bias. The second and more important reason can be illustrated using a little example. Imagine we observe a trade value of 100 million EUR for a category for a specific country pair which has two subcategories, one taxed at 20% and the other at 10%, but no trade values are reported for these two subcategories. Now assume that the weight computed from other country pairs would suggest a 50:50 split, which would result in an estimate of the VAT payment of 15 million EUR. The actual VAT payment can be bound between 10 and 20 million EUR. The maximal potential errors are therefore -5 and +5 million EUR, respectively. Our bias criterion however would count the full 100 million EUR.

are included in the category travel. However, the described transactions provided in the BoP cannot be aligned with the rules for value-added taxation which depend on the place where the service is actually carried out, e.g. a passenger transport from France to Poland is also subject to German VAT for the distance travelled through Germany. Moreover, a substantial part of passenger transport can be considered to be B2C which further justifies the exclusion. The bias of excluding passenger transport should be rather small, given that a majority of countries zero rates international passenger transport.²⁰ The share of passenger transport in intra-EU services trade is 3.5 percent according to import data and 3.8 percent based on export data. Second, we excluded personal and business travel. Data on travel excludes passenger transport and covers goods and services consumed by travellers. The exclusion of personal travel, which makes up 18.8 percent (19.6 percent using export data) of total intra-EU services trade, is straightforward. The recorded data on business travel mainly consists of hotel and restaurant services, which are both not reverse charged as they are taxed at the place where they are physically carried out (Article 47 and 55) and not the place of establishment of the purchaser. Business travel has a share of 4.6 percent (5.6 percent using export data) in total intra-EU services trade.

Table 3.1 Share of excluded service categories in total EU27 services trade 2011

	import data	export data
Passenger transport	3.8%	3.5%
Business travel	4.6%	5.6%
Personal travel	19.6%	18.8%
Construction (goods and services purchased by constructor)	1.3%	0.2%
Insurance	2.4%	2.8%
Financial services	4.4%	7.2%
Merchanting	0.0%	5.8%
Education services	0.1%	0.1%
Other personal, cultural and recreational services	0.2%	0.3%
Government services	0.7%	0.3%
Unallocated services	0.2%	0.1%
Total	37.3%	44.7%

Source: EUROSTAT, balance of payments and own calculations.

Third, construction services consist of two categories and are recorded asymmetrically in the BoP. Export data of *construction abroad* records construction services provided by an enterprise in another country of its establishment, while import data consists of goods and services purchased by this enterprise in the host country. While the former transaction is included we excluded the latter in order to avoid double counting. Import data of the category *construction in the compiling economy* records construction services to residents of the reporting country supplied by an enterprise established in another country, while export data comprises the goods and services purchased by this enterprise. In

²⁰ International air and sea transportation of passengers is zero rated in all EU-27 countries.

this case the export data position was excluded. The excluded categories amount to 1.8 percent (import data) and 1.0 percent (export data) of intra-EU services trade, respectively.

Fourth, according to Article 135 insurance and financial services are exempted and were therefore excluded from the tax base. Together they amount to 10 percent (6.8 percent using export data) of total intra-EU services trade. Fifth, we excluded merchanting from the analysis for the following reason. According to MSIT 2002 merchanting captures the difference between the value of acquired and resold goods and therefore includes commodity arbitrage and wholesale trading. Typical services as storing, displaying and minimal processing of goods are however not included in the data. As price differences in goods trade are already captured using the ComExt trade data this item was excluded.²¹ Merchanting is recorded asymmetrically, i.e. only as import data, which have a share of 5.8 percent in intra-EU services trade.

Sixth, education services making up 0.1 percent of intra-EU services trade were excluded from the analysis. According to Article 53 place of taxation is where the service is carried out. This implies that some B2B education services like telephone or internet courses or services provided by a physically present lecturer in the country of the customers' establishment are subject to reverse charge. This is presumably a small share of total educational services trade. Seventh, we neglected other personal, cultural and recreational services which are not reverse charged and make up 0.3 percent (0.2 percent based on export data). Further, we excluded government and not allocated services which sum to 0.4 percent (0.9 percent according to export data) of intra-EU services trade. Summing up this implies that 37.3 percent (44.7 percent using export data) of total EU27 services trade are excluded from the analysis as they are not reverse charged. In addition some country specific exemptions apply which increase the share of excluded services trade to 38.3 percent (45.6 percent according to export data) in total EU27 services trade.

Once the relevant tax bases, i.e. the affected services trade flows, have been computed we simply apply the procedure as before to compute the estimates for the potential cross-border VAT payments.

3.3 Results

As for intra-EU goods trade, we present the results following the calculation steps. First, we provide information on **total bilateral services trade**. Afterwards we present data on **affected bilateral services trade**, i.e. only considering service types which are subject to reverse charge and not principally exempted by the individual member states.

Table 3.2 and Table 3.3 present **total bilateral services trade** for the year 2011 using import and export data, respectively. According to import data the three biggest flows are services exported from the United Kingdom to Germany (19 bn EUR), from Germany to France (17 bn EUR) and from France to Germany (14 bn EUR). The pattern looks quite differently when export data is used. In this case the biggest flows are services supplied from Germany to the United Kingdom (20 bn EUR), from Spain to the United Kingdom (19 bn EUR) and from Austria to Germany (17 bn EUR). These

²¹ In the most recent standard according to MSIT 2010 this category is discontinued as price differences are captured differently (see United Nations, 2012).

differences already highlight the quality problem concerning the service data. Columns of Table 3.2 and Table 3.3 represent total per country imports of services from the other member states. The row sums are the total per country exports of services to the EU27. The biggest importers are Germany (import data: 118 bn EUR, export data: 135 bn EUR), France (import data: 78 bn EUR, export data: 79 bn EUR), and the United Kingdom (import data: 66 bn EUR, export data: 123 bn EUR). While bigger discrepancies in the data compared to goods trade are to be expected, especially the difference for the United Kingdom is striking. The reason for this is the following. In principle services data can be broken down into three main categories: transport, travel and other services. All of those three categories can again be split into many subcategories. The data provided by the United Kingdom, i.e. the import data, does not contain any information for all the subcategories belonging to “other services”²² because of reasons of confidentiality. This is true for all periods starting 2003 up to 2011, which makes it hard to infer information about the structure of “other services”. Although, the United Kingdom reports aggregate figures for total imports of “other services” of 32 bn EUR (summed over the other member states) this number falls short of the corresponding value reported by all the other member countries, i.e. the export data, of 74 bn EUR. This explains the major difference (more than 70 percent) in total services imports between import and export data.²³ Given that when using export data detailed figures are available for many of the concealed categories the export data estimate seems to be more credible. A very similar case is the reported import data by Spain, who only disclose data for a couple of rather aggregated categories. In this case however, total service imports according to import data exceed their counterpart using export data (45 bn EUR versus 31 bn EUR). We will revisit country specific differences in the service structure again at the end of this section. The big deviations for the United Kingdom explain also a considerable part of the differences in total EU27 services trade (import data: 666 bn EUR versus export data: 749 bn EUR). If the United Kingdom is excluded the difference shrinks to about 4 percent. There are some further country-specific deviations in aggregate intra-EU services imports, which are also significant but of considerably smaller size than for the United Kingdom. The biggest of those is recorded for the Netherlands with services imports of 43 bn EUR according to import data and 63 bn EUR to export data. There is no single explanation for this inconsistency. More than 11.4 bn EUR of the gap are due to differences in *air passenger transport* (211), *travel* (236), *financial services* (260) and *merchandising* (270) which will be excluded and are therefore of no concern for the analysis. The remaining difference stems mainly from other business services like *computer services* (263), *public relations services* (276), *architectural, engineering and other technical consultancy services* (280) and *other miscellaneous business services* (284) which makes it very difficult to find any clear indication of which of both data sources seems to be more accurate.

There are three additional interesting findings when looking at total bilateral trade flows. First, service exports from the Netherlands to Ireland amount to 11.5 bn EUR (export data: 14 bn EUR), which represent about 27 percent (export data: 35 percent) of total Irish service imports from the EU27 and are therefore remarkably big. A major share of those flows is due to transfers of *royalties and license*

²² “Other services comprise: communications services, construction services, insurance services, financial services, computer and information services, royalties and license fees, other business services, personal, cultural and recreational services, and government services.

²³ The rest of the deviation is explained by differences for transportation (12 bn EUR) and travel (4 bn EUR) which will be excluded anyway.

fees (266²⁴). This can be explained by profit tax avoidance behavior of multinationals which in the course of profit shifting transfer intellectual property rights between subsidiaries and make use of peculiarities of the tax laws of the involved countries in order to save taxes.²⁵ Second, a similar observation can be made for service imports into Ireland from Luxembourg. Also these flows mainly consist of royalties and license fees. However, they are just recorded using import data, i.e. at the Irish side. The corresponding export data entry delivered by Luxembourg is not available due to confidentiality and probably not included in the reported total services trade numbers. Third, there is a big difference in the data concerning the service imports into France from Germany. According to import data this flow amounts to 16.6 bn EUR while in the export data it is recorded with a size of only 11.7 bn EUR. The majority of this deviation is due to differences in *other business services* (268). Looking at a more detailed level reveals that this can be mainly explained by inconsistencies for the residual categories *other trade related services* (271) and *other miscellaneous business, professional and technical services* (284) which makes it difficult to speculate about the reason of this deviation. In any case as those categories are treated as typical business services subject to reverse charge the difference in the bilateral trade flow will also translate into differences concerning the potential VAT payments.

For computing the possible cross-border VAT transfers one has to derive the relevant tax basis, i.e. what we refer to as the affected services trade flows. In contrast to goods trade many categories have to be excluded as described above, which implies that the relative size of total services trade flows can differ considerably from the affected flows. For example, export flows from a typical tourism country will have a lower relative impact on total VAT payments received as services like travel are excluded from the analysis because they are not reverse charged. Table 3.4 and Table 3.5 report **bilateral affected services trade**. To illustrate the argument from above, the net position in services trade of Austria with Germany is reduced by 4.3 bn EUR (export data: 6 bn EUR) if affected instead of total trade is considered mainly because all travel related services are excluded. A similar reduction can be computed for the net position of Italy to Germany: 4 bn EUR (export data: 2.7 bn EUR). Total affected service imports of all EU27 countries amounts to 62 percent (export data: 54 percent) of total service imports. Hence, in comparison to goods trade where only about 2 percent of trade volume was not affected a considerably bigger share was excluded from the relevant tax base. The variation in the structure of services imports for different countries implies that for some member states the share of affected in total trade is significant higher than the average, while it is lower for other countries. The countries with the highest share of affected services trade in total services trade are Ireland (import data: 79 percent, export data: 77 percent), Hungary (import data: 76 percent, export data: 66 percent) and Finland (import data: 73 percent, export data: 63 percent). The lowest shares, all close to 40 percent, are observed for Greece, Latvia and Luxembourg.

Based on the affected bilateral services trade flows we can compute the related **potential VAT cross-border payment flows**. Again, this is done using trade data from 2011 as presented above while using the most recent VAT rates (effective in March 2013). Table 3.6 and Table 3.7 show the bilateral flows of potential VAT payments using import and export data, respectively. Using import data the

²⁴ This category consists of franchise and similar rights (891) and other royalties and license fees (892).

²⁵ In tax expert jargon this specific profit shifting strategy is known as “Double Irish with a Dutch Sandwich”. OECD (2013) offers a recent overview related to this topic.

biggest potential cross-border VAT payments related to services trade are computed for supplies from the Germany to France (2.6 bn EUR), from the Netherlands to Ireland (2.5 bn EUR) and from the United Kingdom to Germany (2.4 bn EUR). Given the relatively poor quality of the data the biggest VAT payment flows according to export data are quite different. In this case the most sizable payments would be made from the Netherlands to Ireland (3.2 bn EUR) and from Germany and France to the United Kingdom (1.9 and 1.8 bn EUR). According to import data the biggest aggregate receipts of services trade related VAT would be made by Germany (12.6 bn EUR), France (10 bn EUR) and Ireland (7.6 bn EUR). Using export data the ranking would be: Germany (13.2 bn EUR), the United Kingdom (13 bn EUR) and France (8.5 bn EUR). The remarkable differences for the United Kingdom were discussed above and are related to not disclosed import data. The biggest senders of cross-country VAT related to services trade are Germany (import data: 14.8 bn EUR, export data: 10.4 bn EUR), the United Kingdom (import data: 14.2 bn EUR, export data: 10.3 bn EUR) and the Netherlands (import data: 9.3 bn EUR, export data: 9.5 bn EUR). Like in the previous section Table 3.8 and Table 3.9 show the effective VAT tax rates, i.e. the total potential VAT payment per country pair as share of the corresponding affected trade flow. In contrast to goods trade hardly any reduced rates are applied to services which explains that the effective rates are very close to, and for many countries which do not use reduced rates for the relevant services categories at all, even coincide with, the standard VAT rates. In the remainder of this section we will have a closer look at the composition of the potential VAT payment flows.

Table 3.3 Bilateral total service trade 2011, in million EUR, export data

		Destination													
		AT	BE	BG	CY	CZ	DK	EE	FI	FR	DE	EL	HU	IE	IT
Source	AT	-	756	240	131	1 039	321	32	226	1 093	17 493	149	1 215	158	2 356
	BE	454	-	73	112	312	1 065	44	672	9 575	5 934	177	1 406	1 801	
	BG	157	149	-	28	118	69	5	37	219	692	418	98	57	149
	CY	33	32	91	-	40	27	54	22	61	699	430	41	12	24
	CZ	717	615	84	79	-	149	20	49	617	4 205	66	274	303	473
	DK	306	932	64	77	134	-	79	925	1 291	4 684	252	206	372	979
	EE	53	43	10	46	10	80	-	1 086	54	165	7	8	54	33
	FI	148	245	26	31	70	304	395	-	394	1 255	58	31	300	325
	FR	816	16 879	139	95	12	956	88	494	-	17 279	442	273	3 272	6 555
	DE	6 403	5 177	437	381	2 314	3 957	101	1 153	11 708	-	877	1 510	3 029	6 262
	EL	407	608	107	588	203	306	14	144	1 521	3 062	-	49	139	1 094
	HU	1 252	324	116	39	283	137	3	154	531	2 530	79	-	198	679
	IE	550	1 442	73	1 080	268	1 063	17	670	4 797	7 658	188	552	-	4 666
	IT	2 164	2 890	236	89	710	471	41	447	5 760	9 095	590	467	1 574	-
	LV	64	40	3	45	7	135	150	105	52	163	8	6	23	33
	LT	96	86	1	59	12	124	82	74	123	401	16	6	19	69
	LU	267	4 567	26	70	132	391	24	482	5 224	8 793	136	140	711	3 496
	MT	83	38	3	18	12	57	5	19	233	504	21	11	25	285
	NL	621	5 034	139	235	325	1 355	24	1 067	4 072	12 459	501	834	13 986	2 325
	PL	823	722	102	123	1 263	499	45	320	1 286	6 509	48	256	583	540
	PT	157	574	7	16	36	179	9	191	2 686	1 892	46	48	413	674
	RO	349	353	121	91	76	30	0	61	695	879	79	358	113	673
	SK	387	70	7	17	936	28	3	22	106	598	6	233	34	138
	SI	715	124	24	11	84	38	2	14	129	547	13	182	28	1 040
	ES	622	3 674	70	139	185	1 096	7	701	12 392	11 604	285	317	2 173	4 737
	SE	637	872	48	55	198	3 201	257	3 349	3 792	3 836	130	248	587	830
	UK	865	3 422	224	899	664	3 293	75	1 491	10 605	11 986	1 367	612	10 397	6 153
	Sum	19 147	49 670	2 469	4 554	9 441	19 331	1 577	13 975	79 016	134 923	6 389	8 145	39 964	46 389

Source: EUROSTAT, balance of payments and own calculations. Note: See appendix for treatment of missing values.

		Destination													
		LV	LT	LU	MT	NL	PL	PT	RO	SK	SI	ES	SE	UK	Sum
Source	AT	52	42	282	47	1 910	812	100	726	745	495	360	601	1 550	32 931
	BE	30	39	2 502	120	8 642	568	412	231	137	56	1 264	1 041	6 275	43 113
	BG	7	6	9	12	142	134	7	267	50	22	70	55	519	3 493
	CY	57	12	11	7	138	106	4	116	8	3	17	87	1 175	3 307
	CZ	15	44	94	4	667	591	43	159	1 715	72	275	232	837	12 397
	DK	137	160	124	51	1 413	530	139	62	67	42	817	5 103	2 826	21 770
	EE	230	115	21	10	134	50	3	5	4	1	20	330	173	2 745
	FI	87	76	157	20	459	247	72	46	33	22	443	2 149	947	8 343
	FR	122	67	4 044	835	7 856	1 289	1 246	992	217	333	4 410	1 723	15 492	85 926
	DE	72	203	7 189	119	11 018	3 623	1 005	541	540	355	4 681	2 430	20 341	95 426
	EL	65	24	114	55	781	307	78	189	47	34	325	309	4 055	14 624
	HU	20	16	74	18	649	379	160	570	498	83	485	327	1 032	10 633
	IE	36	39	975	17	3 377	585	532	90	83	38	2 442	1 811	15 052	48 101
	IT	147	114	765	112	2 545	1 542	481	692	317	448	2 792	1 499	6 044	42 030
	LV	-	185	6	13	61	40	3	1	14	3	13	160	170	1 501
	LT	206	-	3	2	143	208	2	1	4	2	45	70	95	1 950
	LU	41	23	-	80	1 927	202	235	141	74	13	916	1 115	6 963	36 190
	MT	4	3	13	-	81	96	4	5	4	2	56	195	904	2 680
	NL	21	53	491	23	-	1 173	364	255	349	42	1 821	1 152	9 601	58 323
	PL	89	336	248	38	1 705	-	63	103	680	51	339	656	1 587	19 015
	PT	9	9	203	16	810	102	-	36	8	8	2 529	208	2 778	13 645
	RO	9	1	18	4	442	38	10	-	39	17	173	58	703	5 390
	SK	7	6	31	3	283	384	5	16	-	57	24	24	272	3 696
	SI	2	6	41	3	131	39	6	35	42	-	31	46	155	3 487
	ES	53	73	1 167	59	5 086	646	3 846	259	86	4	-	1 578	19 145	70 004
	SE	177	161	612	21	1 556	1 539	301	101	112	47	846	-	4 307	27 822
	UK	143	210	2 899	333	11 306	1 613	873	432	577	82	6 023	3 711	-	80 253
	Sum	1 837	2 025	22 094	2 023	63 260	16 843	9 994	6 072	6 450	2 330	31 216	26 669	122 995	748 795

Table 3.4 Bilateral affected service trade 2011, in million EUR, import data

		Destination													
		AT	BE	BG	CY	CZ	DK	EE	FI	FR	DE	EL	HU	IE	IT
Source	AT	-	378	101	5	451	103	19	142	601	5 838	218	662	141	1 330
	BE	328	-	28	22	200	555	26	318	5 608	2 825	147	196	1 682	1 601
	BG	273	120	-	4	44	43	2	12	114	452	72	52	7	170
	CY	62	105	33	-	29	62	120	27	69	711	323	124	25	148
	CZ	625	366	41	3	-	171	14	100	618	2 051	48	219	94	407
	DK	76	1 497	22	7	54	-	40	693	555	1 370	155	113	362	563
	EE	36	30	1	1	4	80	-	374	16	345	1	4	3	27
	FI	143	260	10	3	46	388	236	-	349	786	22	20	111	224
	FR	439	5 982	40	35	469	826	48	396	-	8 207	406	292	1 771	4 099
	DE	5 935	4 862	184	70	1 980	4 329	233	2 269	13 514	-	780	1 981	2 055	5 058
	EL	138	201	65	327	23	334	1	56	300	1 631	-	12	54	793
	HU	850	198	32	2	117	86	14	100	403	1 287	47	-	43	721
	IE	184	693	76	16	238	321	17	313	2 439	4 764	50	240	-	3 201
	IT	679	1 547	61	44	227	695	23	298	3 136	3 667	409	176	979	-
	LV	28	19	3	3	21	116	194	79	44	70	3	12	7	47
	LT	99	56	1	2	8	162	115	42	393	436	5	11	9	131
	LU	83	1 224	9	6	59	87	4	54	1 870	1 543	43	111	5 090	828
	MT	15	39	82	2	3	16	6	2	90	358	21	9	911	65
	NL	633	4 761	62	40	426	1 269	64	617	5 136	7 577	307	703	11 004	2 469
	PL	629	496	37	5	254	336	73	245	919	3 756	52	235	182	766
	PT	77	244	2	2	30	68	3	76	601	343	19	26	110	525
	RO	497	121	49	8	67	50	3	25	588	668	90	214	37	416
	SK	686	159	16	4	706	77	3	24	240	776	6	294	17	246
	SI	419	32	8	0	29	22	3	7	93	168	10	50	12	373
	ES	246	1 113	23	23	182	633	14	175	3 081	3 087	141	116	589	1 489
	SE	225	698	19	7	104	2 686	185	1 705	2 213	1 740	56	112	357	883
	UK	874	3 623	162	127	426	2 853	94	1 348	8 094	12 658	1 795	696	7 577	4 182
	Sum	14 278	28 825	1 167	767	6 197	16 366	1 555	9 497	51 082	67 114	5 225	6 679	33 227	30 761

Source: EUROSTAT, balance of payments and own calculations. Note: See appendix for treatment of missing values. "Affected trade" refers to the relevant tax base subject to the reverse charge mechanism.

		Destination													
		LV	LT	LU	MT	NL	PL	PT	RO	SK	SI	ES	SE	UK	Sum
Source	AT	9	7	73	53	918	418	42	363	166	224	255	154	421	13 091
	BE	14	23	746	10	2 543	461	227	100	128	23	1 186	630	1 704	21 331
	BG	3	17	5	3	44	36	3	47	9	14	39	8	102	1 695
	CY	16	20	11	166	91	233	7	131	44	11	24	50	181	2 824
	CZ	14	9	69	1	369	519	10	83	637	64	145	111	244	7 032
	DK	16	47	44	11	452	469	34	11	24	39	295	1 890	1 102	9 939
	EE	64	65	12	0	29	27	1	3	10	2	5	69	23	1 230
	FI	44	148	26	7	327	171	14	9	7	6	163	1 459	357	5 336
	FR	13	23	1 299	24	3 217	1 084	591	329	100	95	5 057	1 155	5 091	41 088
	DE	64	87	1 362	229	5 192	3 202	646	761	436	268	5 382	2 902	5 994	69 774
	EL	1	39	57	4	202	34	14	78	3	7	102	133	472	5 080
	HU	6	3	56	1	305	167	32	175	105	63	623	141	335	5 912
	IE	18	6	123	23	2 075	432	165	61	10	103	1 109	653	2 678	20 008
	IT	14	14	324	130	1 123	636	208	316	114	116	1 920	550	2 582	19 989
	LV	-	124	3	0	31	77	1	16	7	2	19	50	20	996
	LT	92	-	2	0	74	123	2	2	2	14	32	65	66	1 945
	LU	3	3	-	8	687	183	52	24	9	38	694	67	1 687	14 465
	MT	3	25	6	-	10	24	5	60	3	0	127	6	92	1 983
	NL	26	33	486	20	-	1 018	384	271	121	30	2 781	954	3 011	44 203
	PL	33	111	96	1	925	-	22	61	54	41	266	426	636	10 656
	PT	0	1	44	2	140	34	-	14	2	2	1 454	21	419	4 257
	RO	3	4	32	1	166	67	15	-	15	25	93	58	138	3 451
	SK	3	3	16	0	184	227	4	31	-	43	38	46	61	3 909
	SI	1	3	3	1	106	25	3	17	13	-	6	17	19	1 440
	ES	10	8	234	11	1 286	298	1 409	64	15	9	-	330	2 219	16 807
	SE	42	44	115	64	591	351	47	35	10	34	396	-	1 657	14 375
	UK	66	60	1 740	330	7 602	1 324	711	400	100	141	8 248	2 927	-	68 159
	Sum	578	927	6 981	1 102	28 689	11 639	4 651	3 461	2 143	1 415	30 461	14 874	31 312	410 973

Table 3.5 Bilateral affected service trade 2011, in million EUR, export data

		Destination													
		AT	BE	BG	CY	CZ	DK	EE	FI	FR	DE	EL	HU	IE	IT
Source	AT	-	335	143	51	593	108	15	149	613	8 379	66	618	101	1 349
	BE	268	-	54	54	268	839	15	600	6 532	4 604	114	133	1 242	1 413
	BG	67	91	-	16	26	12	1	8	107	254	93	26	35	80
	CY	9	3	76	-	19	5	48	0	16	496	152	27	0	4
	CZ	412	510	29	52	-	73	13	37	406	1 995	15	170	259	226
	DK	234	746	46	57	108	-	70	771	825	2 600	210	167	342	718
	EE	48	32	8	38	7	62	-	518	39	96	5	5	49	13
	FI	66	185	21	22	43	223	147	-	291	930	52	13	154	261
	FR	317	4 190	79	43	9	470	20	324	-	8 901	187	174	1 504	2 652
	DE	3 299	2 525	176	242	1 651	2 063	88	880	6 279	-	273	1 142	2 467	3 340
	EL	146	226	102	401	92	149	9	39	558	1 023	-	9	70	399
	HU	761	146	25	32	123	88	2	109	318	1 502	10	-	149	420
	IE	453	930	62	411	218	861	6	522	3 372	6 075	133	460	-	1 855
	IT	604	1 956	65	58	233	177	8	268	2 337	3 393	253	236	1 111	-
	LV	55	27	1	44	6	52	109	49	41	104	5	2	16	17
	LT	84	83	0	59	9	112	47	23	102	308	15	4	8	48
	LU	98	894	9	12	61	82	3	73	1 713	2 930	53	88	300	604
	MT	43	12	0	8	5	25	3	6	79	344	9	3	5	159
	NL	497	2 918	118	212	259	1 097	12	966	3 025	7 431	395	760	13 808	1 686
	PL	480	592	45	104	558	441	27	278	1 099	3 604	20	202	533	392
	PT	72	268	2	7	15	85	3	91	987	867	26	28	173	406
	RO	273	320	84	60	68	17	0	58	560	628	37	246	108	432
	SK	212	36	1	10	427	18	1	8	61	348	0	80	4	46
	SI	390	92	6	10	53	30	0	7	98	397	8	52	23	253
	ES	147	1 659	32	39	93	261	5	146	3 984	3 531	118	222	990	1 732
	SE	361	613	25	35	110	1 793	142	1 862	3 008	1 873	36	174	436	446
	UK	488	2 136	88	497	355	2 333	29	951	6 662	7 392	786	366	6 752	2 966
	Sum	9 885	21 526	1 297	2 573	5 409	11 475	822	8 742	43 113	70 004	3 071	5 407	30 638	21 916

Source: EUROSTAT, balance of payments and own calculations. Note: See appendix for treatment of missing values. "Affected trade" refers to the relevant tax base subject to the reverse charge mechanism.

		Destination													
		LV	LT	LU	MT	NL	PL	PT	RO	SK	SI	ES	SE	UK	Sum
Source	AT	21	12	136	33	714	356	70	434	394	249	210	392	781	16 324
	BE	19	19	1 237	112	5 760	453	346	174	113	28	887	896	4 686	30 863
	BG	2	1	6	10	45	18	2	63	11	7	17	23	219	1 243
	CY	37	6	3	3	102	20	2	79	1	1	8	8	305	1 429
	CZ	10	17	75	4	531	295	19	99	992	51	136	162	547	7 135
	DK	126	147	60	49	1 084	380	113	47	52	34	573	3 071	2 128	14 757
	EE	157	91	17	9	105	21	1	4	3	1	7	162	110	1 606
	FI	70	64	134	16	371	161	52	40	14	5	241	1 473	661	5 710
	FR	25	29	1 319	47	3 886	795	643	312	180	97	1 588	1 135	8 839	37 764
	DE	53	180	1 284	80	5 727	1 896	511	406	410	279	2 946	1 993	9 589	49 779
	EL	54	11	82	54	364	57	48	94	19	12	141	102	2 350	6 608
	HU	2	4	69	3	437	120	156	159	162	56	305	199	649	6 005
	IE	25	18	385	12	2 755	434	325	54	60	28	1 349	1 393	7 378	29 574
	IT	83	33	395	42	1 216	906	290	293	118	167	1 177	1 069	3 176	19 664
	LV	-	103	1	11	52	33	0	0	3	0	7	69	101	908
	LT	135	-	1	1	128	74	1	1	1	1	38	60	82	1 428
	LU	7	4	-	5	812	99	65	57	18	4	286	167	3 046	11 491
	MT	2	2	2	-	23	86	2	0	0	0	6	89	319	1 233
	NL	11	34	404	5	-	1 043	240	189	327	22	1 144	897	7 597	45 096
	PL	30	111	194	36	1 479	-	35	74	160	45	254	538	1 253	12 585
	PT	3	3	88	9	376	29	-	15	3	2	1 113	96	1 043	5 809
	RO	7	0	16	4	362	19	3	-	35	15	85	48	433	3 920
	SK	3	1	24	0	216	61	2	12	-	38	11	10	162	1 792
	SI	0	4	37	1	81	16	2	9	29	-	16	30	92	1 735
	ES	30	46	581	26	2 097	217	1 812	132	37	2	-	403	8 260	26 600
	SE	72	98	308	7	731	1 276	233	56	78	21	483	-	2 588	16 863
	UK	38	66	2 028	206	7 040	827	535	170	369	45	3 913	2 203	-	49 240
	Sum	1 021	1 106	8 886	785	36 494	9 692	5 510	2 971	3 587	1 213	16 938	16 687	66 392	407 162

Table 3.6 Potential bilateral VAT payments for service trade 2011, in million EUR, import data

		Destination													
		AT	BE	BG	CY	CZ	DK	EE	FI	FR	DE	EL	HU	IE	IT
Source	AT	-	79	20	1	95	26	4	34	118	1 101	50	179	32	279
	BE	66	-	6	4	42	139	5	76	1 099	536	34	53	387	336
	BG	54	25	-	1	9	11	0	3	22	86	16	14	2	36
	CY	12	22	7	-	6	15	24	7	13	135	74	34	6	31
	CZ	125	77	8	1	-	43	3	24	121	389	11	59	22	85
	DK	15	314	4	1	11	-	8	166	109	260	36	30	83	118
	EE	7	6	0	0	1	20	-	90	3	66	0	1	1	6
	FI	29	55	2	1	10	97	47	-	68	149	5	6	26	47
	FR	87	1 256	8	6	98	207	10	95	-	1 542	92	79	407	860
	DE	1 174	1 021	37	13	414	1 082	47	544	2 649	-	178	535	473	1 061
	EL	28	42	13	59	5	83	0	13	59	310	-	3	12	166
	HU	170	42	6	0	24	22	3	23	79	243	11	-	10	151
	IE	37	145	15	3	50	80	3	69	478	902	11	65	-	672
	IT	135	325	12	8	48	174	5	71	615	689	93	47	225	-
	LV	6	4	1	1	4	29	39	19	9	13	1	3	2	10
	LT	20	12	0	0	2	40	23	10	77	83	1	3	2	27
	LU	16	257	2	1	12	22	1	13	366	285	10	30	1 171	174
	MT	3	8	16	0	1	4	1	0	18	68	5	3	210	14
	NL	126	1 000	12	7	89	317	13	148	1 007	1 408	70	190	2 531	518
	PL	126	104	7	1	53	84	15	59	180	714	12	63	42	161
	PT	15	51	0	0	6	17	1	18	118	65	4	7	25	110
	RO	99	25	10	1	14	13	1	5	115	127	20	58	9	87
	SK	137	33	3	1	147	19	1	6	47	147	1	79	4	52
	SI	84	7	2	0	6	6	1	2	18	32	2	13	3	78
	ES	49	234	5	4	38	158	3	42	604	585	32	31	135	312
	SE	45	147	4	1	21	671	37	408	434	329	13	30	82	185
	UK	174	761	32	23	88	713	19	321	1 586	2 368	413	188	1 734	876
	Sum	2 838	6 053	233	138	1 294	4 092	310	2 266	10 012	12 631	1 195	1 803	7 634	6 452

Source: EUROSTAT, balance of payments and own calculations. Note: Column sums represent total per country payments received, while row sums represent payments sent.

		Destination													
		LV	LT	LU	MT	NL	PL	PT	RO	SK	SI	ES	SE	UK	Sum
Source	AT	2	1	9	10	193	96	10	87	33	44	53	39	83	2 676
	BE	3	5	90	2	534	106	51	24	26	5	247	158	335	4 365
	BG	1	3	1	1	9	8	1	11	2	3	8	2	20	349
	CY	3	4	2	30	19	54	2	31	9	2	5	12	36	594
	CZ	3	2	9	0	77	119	2	20	127	13	30	28	48	1 446
	DK	3	10	6	2	95	108	8	3	5	8	61	473	218	2 154
	EE	13	14	1	0	6	6	0	1	2	0	1	17	5	267
	FI	9	31	3	1	69	39	3	2	1	1	34	365	70	1 169
	FR	3	5	161	4	676	243	129	77	20	19	1 050	289	997	8 417
	DE	13	18	170	41	1 090	733	146	181	87	53	1 118	726	1 173	14 778
	EL	0	8	7	1	42	8	3	18	1	1	21	33	94	1 031
	HU	1	1	7	0	64	38	7	42	21	13	129	35	66	1 207
	IE	4	1	15	4	436	98	37	13	2	21	230	163	524	4 080
	IT	3	3	41	23	236	146	47	76	23	23	399	138	508	4 112
	LV	-	26	0	0	6	18	0	4	1	0	4	12	4	216
	LT	19	-	0	0	16	28	0	0	0	3	7	16	13	404
	LU	1	1	-	1	144	42	12	6	2	8	144	17	329	3 064
	MT	1	5	1	-	2	6	1	14	1	0	26	2	18	427
	NL	6	7	54	4	-	226	87	57	24	6	577	238	590	9 312
	PL	7	23	14	0	194	-	5	15	11	8	55	107	125	2 183
	PT	0	0	5	0	29	8	-	3	0	0	302	5	83	876
	RO	1	1	4	0	35	15	3	-	3	5	19	15	27	713
	SK	1	1	2	0	39	52	1	7	-	9	8	11	12	821
	SI	0	1	0	0	22	6	1	4	3	-	1	4	4	299
	ES	2	2	28	2	270	68	308	15	3	2	-	83	437	3 452
	SE	9	9	13	11	124	80	11	8	2	7	82	-	324	3 089
	UK	14	13	208	59	1 596	287	152	87	20	28	1 715	732	-	14 207
	Sum	121	195	851	198	6 025	2 638	1 027	806	429	282	6 327	3 718	6 140	85 710

Table 3.7 Potential bilateral VAT payments for service trade 2011, in million EUR, export data

		Destination													
		AT	BE	BG	CY	CZ	DK	EE	FI	FR	DE	EL	HU	IE	IT
Source	AT	-	70	29	9	124	27	3	36	120	1 588	15	167	23	283
	BE	53	-	11	10	56	210	3	144	1 278	870	26	36	285	296
	BG	13	19	-	3	5	3	0	2	21	48	21	7	8	17
	CY	2	1	15	-	4	1	10	0	3	94	35	7	0	1
	CZ	82	107	6	9	-	18	3	9	80	379	3	46	60	47
	DK	47	157	9	10	23	-	14	184	162	493	48	45	79	151
	EE	10	7	2	7	1	15	-	124	8	18	1	1	11	3
	FI	13	39	4	4	9	56	29	-	57	177	12	3	35	55
	FR	63	880	16	8	2	118	4	77	-	1 687	42	47	341	549
	DE	649	530	35	44	347	516	18	211	1 231	-	62	308	567	699
	EL	29	47	20	72	19	37	2	9	109	193	-	3	16	83
	HU	152	31	5	6	25	22	0	26	62	283	2	-	34	63
	IE	90	195	12	74	46	215	1	125	661	1 153	31	124	-	390
	IT	121	411	13	10	49	44	2	64	458	644	58	64	255	-
	LV	11	6	0	8	1	13	22	12	8	20	1	1	4	4
	LT	17	17	0	11	2	28	9	6	20	59	4	1	2	10
	LU	19	188	2	2	13	20	1	17	336	552	12	24	69	125
	MT	9	2	0	1	1	6	1	1	15	65	2	1	1	32
	NL	99	613	24	38	54	274	2	232	593	1 408	86	205	3 175	353
	PL	96	124	9	19	116	110	5	67	215	684	5	55	123	82
	PT	14	56	0	1	3	21	1	22	193	163	6	7	40	85
	RO	55	67	17	11	14	4	0	14	110	119	9	66	25	91
	SK	42	8	0	2	89	5	0	2	12	66	0	22	1	10
	SI	78	19	1	2	11	8	0	2	19	75	2	14	5	53
	ES	29	348	6	7	19	65	1	35	780	666	27	60	226	361
	SE	72	129	5	6	23	448	28	445	589	355	8	47	100	94
	UK	97	449	18	89	74	583	6	226	1 306	1 390	178	99	1 537	618
	Sum	1 962	4 520	259	463	1 132	2 869	164	2 091	8 447	13 251	697	1 460	7 021	4 552

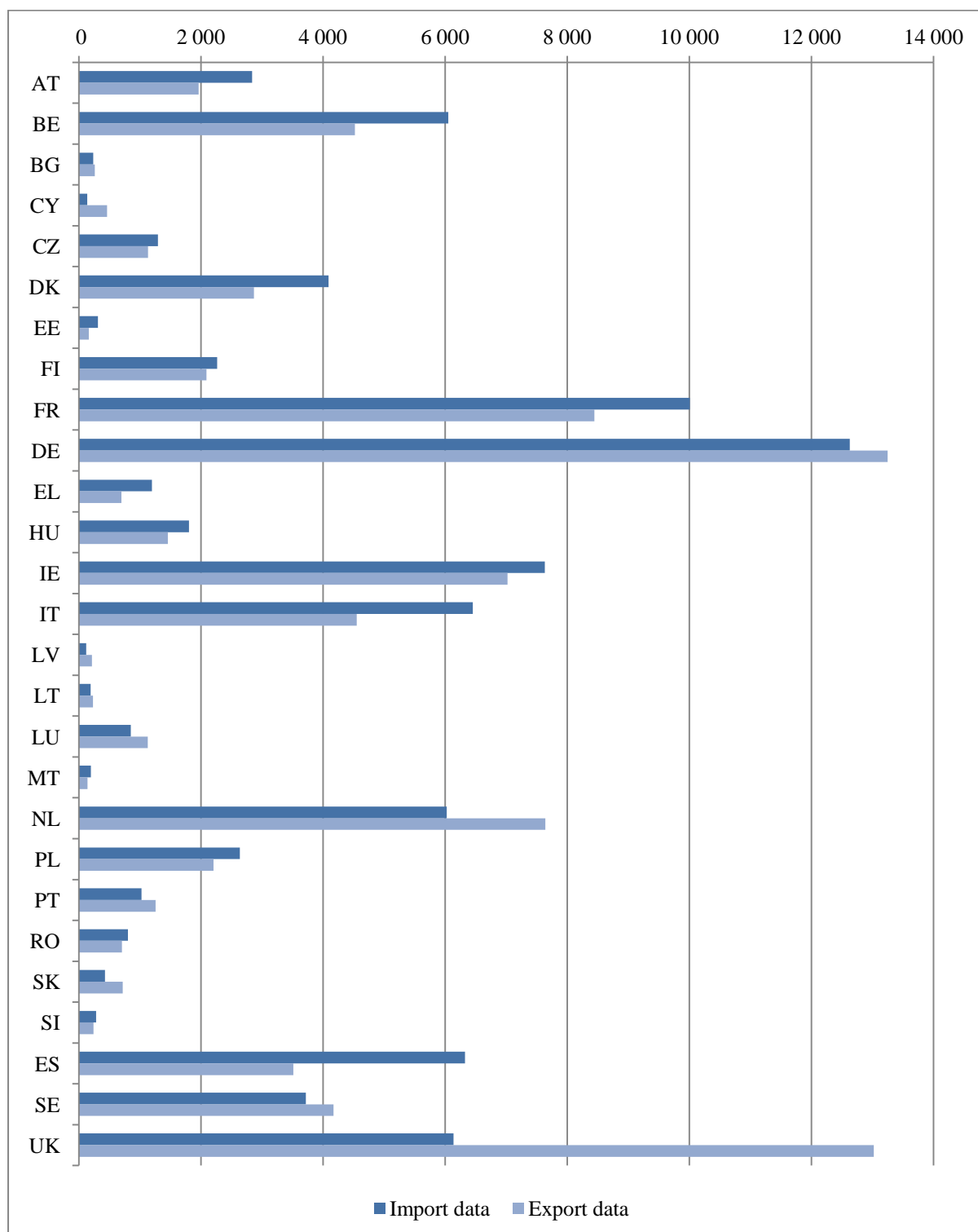
Source: EUROSTAT, balance of payments and own calculations. Note: Column sums represent total per country payments received, while row sums represent payments sent.

		Destination													Sum
		LV	LT	LU	MT	NL	PL	PT	RO	SK	SI	ES	SE	UK	
Source	AT	4	2	19	6	150	82	16	104	79	50	44	98	155	3 303
	BE	4	4	173	20	1 207	104	79	42	23	6	185	224	907	6 256
	BG	0	0	1	2	9	4	0	15	2	1	3	6	44	258
	CY	8	1	0	1	21	5	0	19	0	0	2	2	61	293
	CZ	2	4	11	1	112	61	4	22	198	10	28	40	109	1 451
	DK	27	31	9	9	228	87	26	11	10	7	120	768	419	3 172
	EE	33	19	2	2	22	5	0	1	1	0	2	41	21	356
	FI	15	13	19	3	78	37	12	10	3	1	50	368	131	1 234
	FR	5	6	159	8	799	177	144	73	36	19	326	284	1 750	7 619
	DE	11	38	175	14	1 203	435	118	97	82	56	617	498	1 853	10 414
	EL	11	2	11	10	76	13	11	22	4	2	29	25	466	1 325
	HU	0	1	9	1	92	28	36	38	32	11	44	50	130	1 182
	IE	5	4	21	2	579	100	75	13	12	6	283	348	1 476	6 041
	IT	17	7	56	8	255	208	67	70	24	33	247	267	635	4 089
	LV	-	22	0	2	11	8	0	0	1	0	1	17	20	191
	LT	28	-	0	0	27	17	0	0	0	0	8	15	16	298
	LU	2	1	-	1	171	23	15	14	4	1	59	42	584	2 293
	MT	0	0	0	-	5	20	0	0	0	0	1	22	64	252
	NL	2	7	52	1	-	239	55	45	65	4	238	224	1 469	9 558
	PL	6	23	28	6	311	-	8	18	32	9	53	134	249	2 588
	PT	1	1	12	2	79	7	-	3	1	0	232	24	203	1 176
	RO	2	0	2	1	76	4	1	-	7	3	18	12	86	813
	SK	1	0	4	0	45	14	0	3	-	8	2	2	32	369
	SI	0	1	6	0	17	4	0	2	6	-	3	7	18	354
	ES	6	10	76	5	440	49	412	31	7	0	-	101	1 612	5 381
	SE	15	21	21	1	153	288	54	13	16	4	101	-	516	3 553
	UK	8	14	261	37	1 478	188	122	40	74	9	816	551	-	10 265
	Sum	214	232	1 127	141	7 643	2 204	1 256	706	717	242	3 515	4 172	13 025	84 083

Figure 3.1 summarises the potential cross-border VAT payment receipts related to services trade for all 27 member states. Differences between results based on import versus export data are mostly related to deviations in the underlying aggregate services imports, as discussed in more detail for the United Kingdom, Spain and the Netherlands already in the second paragraph of section 3.3. However, other big traders like France, Italy and Belgium also show a significant gap in VAT payments received depending on the data source although deviations in total services imports are relatively small. This can be explained by differences in the structure of those imports. Hence, similar total services imports per country can make the data seem more consistent than it actually is. Take France as an example. Imports based on export data for the categories *financial services* (260) and *travel* (236) are lower by 7.9 bn EUR than their import data counterparts, while the pattern is reversed for services like *research and development* (279), *architecture, engineering, etc.* (280) and *other trade-related* (271) or *miscellaneous business services* (284). Those deviations virtually cancel in the aggregate for total but not for affected services imports because items like *financial services* (260) and *travel* (236) are not relevant for the computation of currently reverse charged VAT. Very similar patterns and explanations can be found for Italy and Belgium. How individual country-specific VAT receipts look like at a more disaggregated level is illustrated in Figure 3.2 and Figure 3.3. The figures divide services into four groups: a) transport, b) information, construction and computer services, c) franchise, royalties and other trade-related services and d) others.²⁶ On one hand those illustrations again demonstrate the explained differences in the import structure between import and export data, e.g. the share of “information, construction and computer services”-related in total VAT payments for France is much smaller using import data. On the other hand the figures also illustrate the variation in the services import structure between member states. As argued before a large share in VAT payment receipts in Ireland is due to royalty and licencing fees. In contrast, countries like Denmark, Latvia or Lithuania show an exceptional high share of VAT payments received related to transport services. The next section will consolidate the results for goods and services trade.

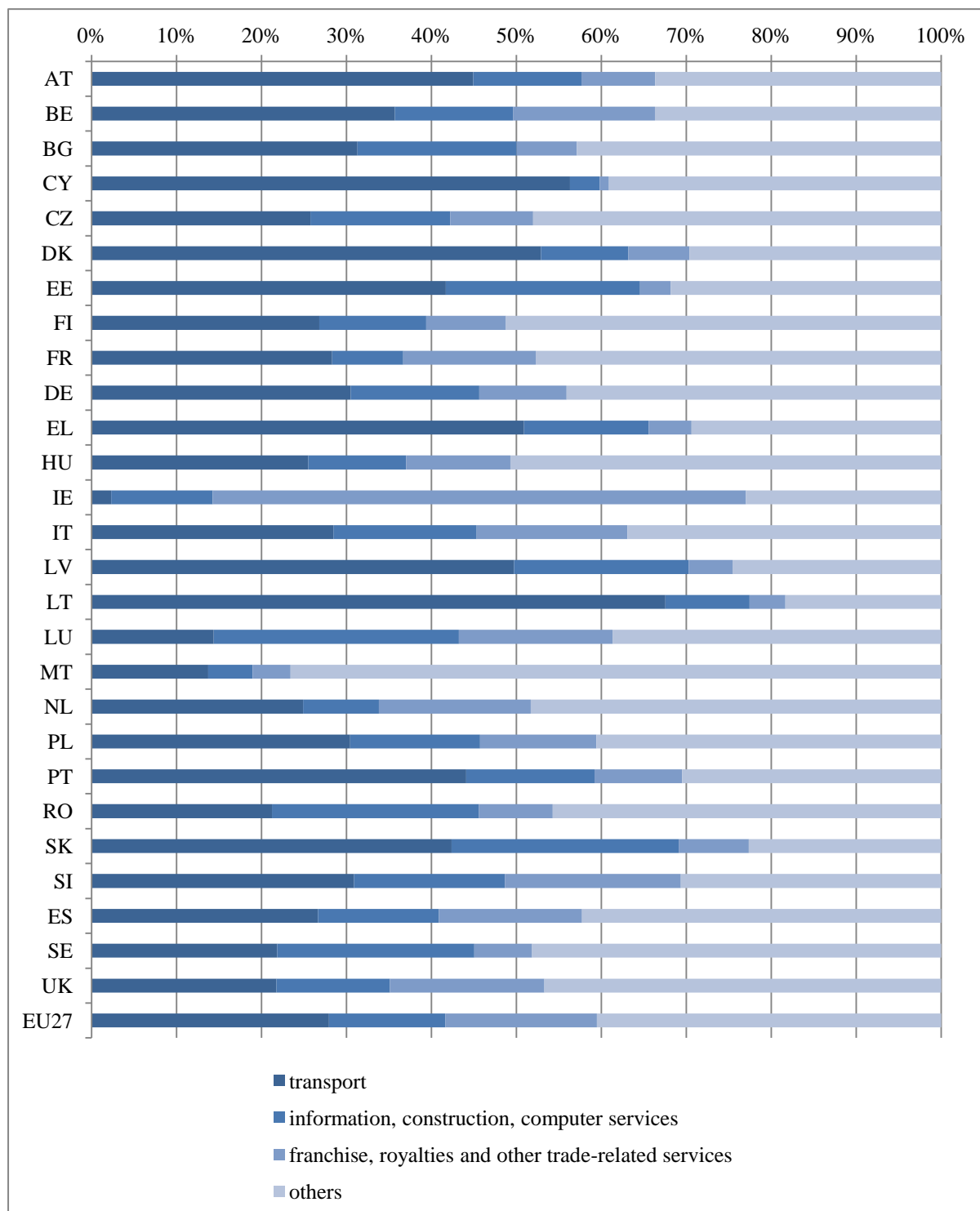
²⁶ Services are grouped according to the category list provided in Table A3.1. “Transport” is comprised by categories 207 to 232. “Transport” is comprised by categories 207 to 232, “information, construction and computer services” by 891 to 271 and “franchise, royalties and other trade-related services” by 958 to 890.

Figure 3.1 VAT payments (received) for services trade 2011, in million EUR



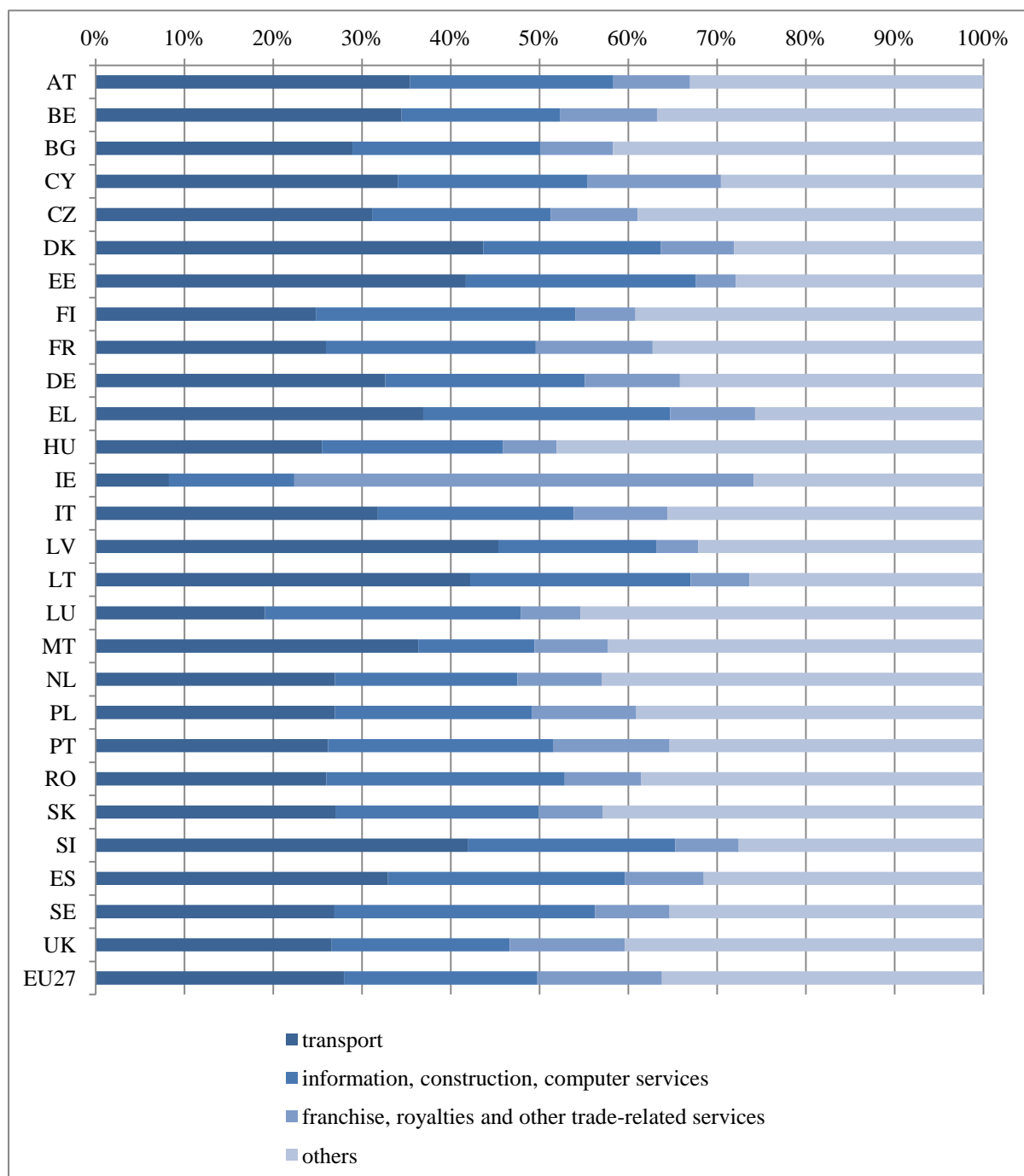
Source: EUROSTAT, balance of payments and own calculations.

Figure 3.2 Structure of VAT payments (received) for services trade 2011, in million EUR, import data



Source: EUROSTAT, balance of payments and own calculations.

Figure 3.3 Structure of VAT payments (received) for services trade 2011, in million EUR, export data



Source: EUROSTAT, balance of payments and own calculations.

4 Value added tax on bilateral trade in goods and services

This section consolidates the estimates of the two previous ones by looking at the potential cross-border VAT payments of total trade, i.e. of goods and services trade combined, which would occur if the current reverse charge mechanism would be replaced as suggested. The previous sections emphasised the limitations of the analysis mainly implied by the quality of the available trade data. Especially, the data for services trade is inaccurate which was shown by comparing import and export data. In some cases, e.g. for the United Kingdom, the gap between both data source, which in an ideal setting should vanish²⁷ because in principle the same transactions should be recorded but from different point of views, are strikingly large. However, in contrast to goods trade which is documented at much higher quality, services trade is smaller in size and also a smaller share of it is actually reverse charged and therefore relevant for our analysis. Hence, its impact on the total result is less significant.

Table 4.1 and Table 4.2, similarly to the previous sections, present the relevant tax bases for all countries at a bilateral level for the year 2011. The **affected trade flows** were simply computed by adding the corresponding results from section 2 and 3. We always combined import data for goods and for services as both measure inflow transactions from the perspective of the destination country. Similarly, we added export data for goods and for services. Total affected intra-EU cross-border trade is estimated to be 3 067 bn EUR according to import data. The estimate according to export data is 3 100 bn EUR. Affected trade flows therefore amount to about 24-25 percent of EU27 gross domestic product in 2011 at current prices. The three biggest countries receiving respective affected trade flows are Germany (import data: 604 bn EUR, export data: 620 bn EUR), France (import data: 383 bn EUR, export data: 387 bn EUR) and the United Kingdom (import data: 260 bn EUR, export data: 308 bn EUR). The biggest sending countries are Germany (import data: 664 bn EUR, export data: 648 bn EUR), the Netherlands (import data: 383 bn EUR, export data: 387 bn EUR) and France (import data: 284 bn EUR, export data: 280 bn EUR).

From the tax base one can infer the involved VAT payments which would occur in case the reverse charge system would be replaced by a system under which the supplier transfers the VAT to the tax authorities in the importing firms' country of establishment. Table 4.3 and Table 4.4 show those potential intra-EU VAT payments computed using import and export data, respectively. Total VAT payments amount to 591 bn EUR (595 bn EUR when using export data) which is about 4.7 percent of EU27 gross domestic product in 2011 at current prices. The single biggest VAT payment flow would be recorded from the Netherlands to Germany (import data: 21.4 bn EUR, export data: 21.5 bn EUR). The biggest receiving country would be Germany (import data: 110 bn EUR, export data: 113 bn EUR) and France (import data: 110 bn EUR, export data: 113 bn EUR). The most important sending member states are Germany (import data: 132 bn EUR, export data: 128 bn EUR) and the Netherlands (import data: 71 bn EUR, export data: 72 bn EUR).

²⁷ Exceptions are asymmetric recordings by design like for construction or merchanting, although the latter has been excluded from the analysis.

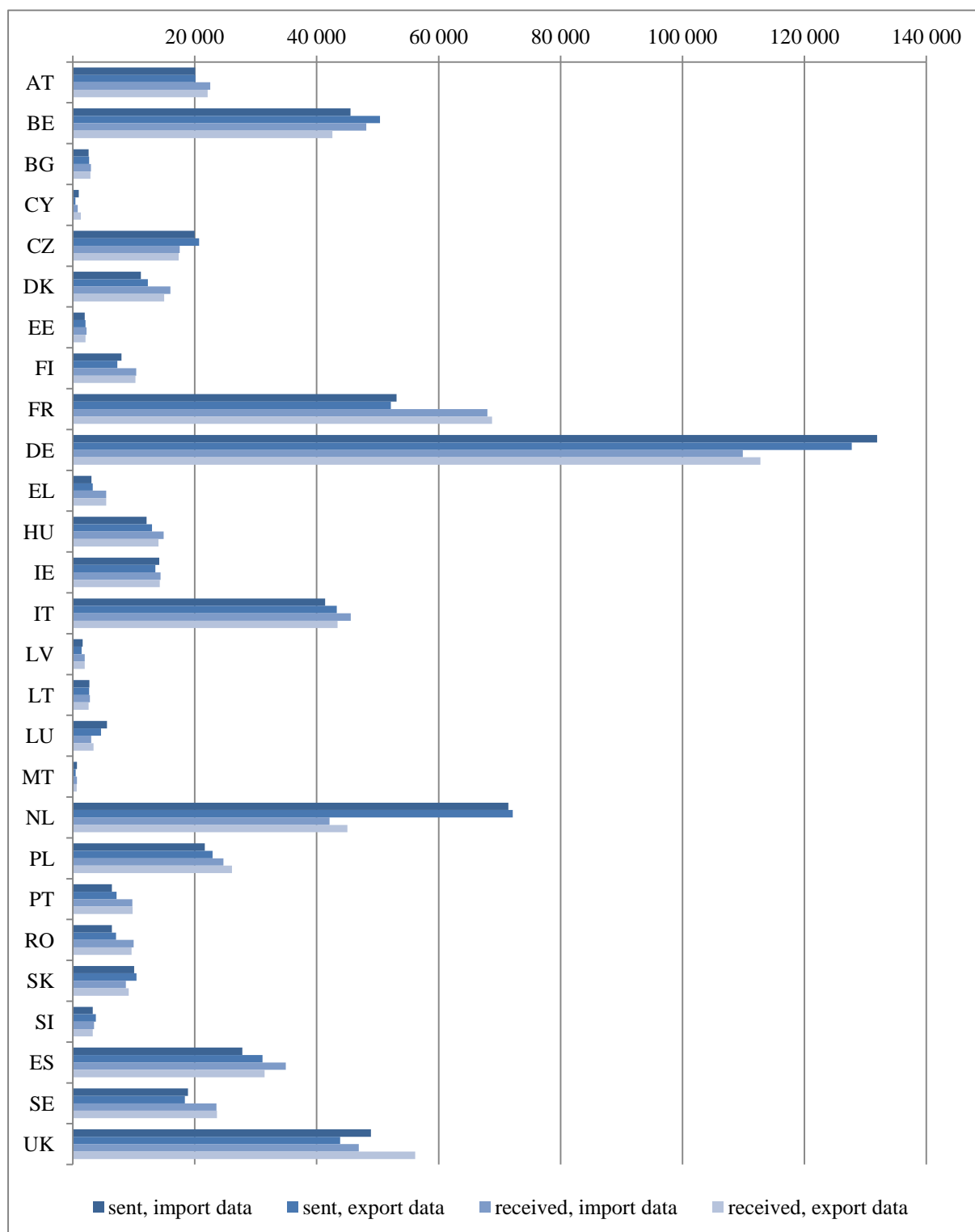
Figure 4.1 shows a bar chart illustrating total VAT payments received and sent per country and data source. The largest differences between payments sent and received are computed for the Netherlands and Germany that are characterized by higher outflows than inflows due to their positive net export position vis-à-vis the other 26 member states, and France for which inflows would exceed the outflows considerably. Obviously, in total, i.e. summing over all 27 member states, VAT payments received equal payments sent. The chart also reveals that the discrepancy in the services trade data for the United Kingdom is still perceivable but of less importance for the overall figures in relative terms.

As last exercise of this section the potential VAT payments are compared to the actual VAT revenue collected under the current regime by the member state governments. Table 4.5 reports total VAT revenues from 2011 according to the national accounts tax aggregates from Eurostat and potential VAT payments received while Table 4.6 shows potential VAT payments sent. Depending on which data source is used total cross-border VAT payments in the EU27 make up 65 to 66 percent of the combined VAT revenues of all 27 member states from 2011. For 12 out of the 27 Member States the calculated payment to be received even exceeds the VAT revenue. According to export data, Slovakia would have to collect cross-border payments of almost twice (194 percent) the size as current VAT revenue. High shares are also computed for Hungary (165 percent), Belgium (164 percent), the Czech Republic (158 percent) and Estonia (152 percent). This might seem astonishing at first but can reasonably be explained. We calculated total VAT which should currently be reverse charged by the importing firms to compute the VAT payments which would have to flow cross-border if the current mechanism was replaced by a system under which the supplier charges and transfers the VAT. As firms can deduct VAT paid for intermediates only a part of the chain of passed on VAT is eventually collected as government revenue. If imported goods and services are not consumed domestically but rather used for production of goods and services which are exported again, VAT can be reclaimed and is therefore never collected by the government. This explains why small member states with a strong export orientation that are importing a big amount of intermediate goods and services collect relatively little VAT revenue compared to the computed cross-border payment flows. A big share of value added figuratively just passes through those countries. This claim is supported by the numbers reported in Table 4.6 which compares collected VAT revenue with potential VAT payments to be sent. In descending order, the highest shares are reported for Slovakia (222 percent), Belgium (194 percent), the Czech Republic (189 percent), the Netherlands (173 percent), Luxembourg (172 percent), Hungary and Estonia (152 percent each). With the exception of the Netherlands and Luxembourg those are the same countries as listed before, i.e. countries with a high share of exports and imports compared to value added, typically referred to as small, open economies. The comparatively high share of payments sent versus payments received for the Netherlands and Luxembourg simply reflects their positive trade net position vis-à-vis the other Member States.

The lowest shares of intra-EU VAT payments received (37 percent) and sent (22 percent) to VAT revenue are computed for Greece which can be explained by comparably low imports and exports in 2011 and that a big share of exports including travel, etc. is not reverse charged and therefore excluded. Low shares are also calculated for the most populous Member States Germany, France, the United Kingdom, and Italy. For those four countries shares of VAT payments received in VAT revenue range from 59 percent (Germany) to 44 percent (Italy and the United Kingdom) while the shares of VAT payments sent fall into the range of 67 percent (Germany) to 34 percent (the United

Kingdom). While those Member States are big traders in absolute numbers the presented shares are comparably low because of their big domestic markets which imply that larger shares of the imports are eventually used for domestic final consumption. Differences between VAT payments received and sent can again be explained by the net trading position vis-à-vis the rest of the EU27.

Figure 4.1 Country aggregates for potential total VAT payments received and sent for 2011, in million EUR



Source: EUROSTAT, ComExt, balance of payments and own calculations.

Table 4.5 Potential VAT payments received for goods and services trade compared to VAT revenue 2011, in million EUR

	Import data			Export data			VAT revenue	Payments/revenue	
	VAT payments received			VAT payments received				import data	export data
	Goods	Services	Total	Goods	Services	Total			
AT	19 703	2 838	22 541	20 135	1 962	22 097	23 447	96%	94%
BE	42 089	6 053	48 142	38 057	4 520	42 577	26 021	185%	164%
BG	2 755	233	2 988	2 644	259	2 903	3 352	89%	87%
CY	649	138	787	857	463	1 320	1 517	52%	87%
CZ	16 227	1 294	17 521	16 242	1 132	17 374	10 994	159%	158%
DK	11 928	4 092	16 019	12 116	2 869	14 984	23 870	67%	63%
EE	1 944	310	2 255	1 901	164	2 065	1 363	165%	152%
FI	8 136	2 266	10 402	8 182	2 091	10 273	16 915	61%	61%
FR	57 966	10 012	67 978	60 302	8 447	68 749	140 506	48%	49%
DE	97 272	12 631	109 903	99 544	13 251	112 795	189 920	58%	59%
EL	4 269	1 195	5 464	4 797	697	5 494	15 027	36%	37%
HU	13 089	1 803	14 893	12 593	1 460	14 052	8 517	175%	165%
IE	6 747	7 634	14 380	7 237	7 021	14 258	9 782	147%	146%
IT	39 150	6 452	45 603	38 888	4 552	43 440	98 557	46%	44%
LV	1 841	121	1 962	1 727	214	1 942	1 368	143%	142%
LT	2 584	195	2 778	2 359	232	2 591	2 444	114%	106%
LU	2 146	851	2 997	2 261	1 127	3 387	2 690	111%	126%
MT	481	198	679	506	141	647	520	131%	124%
NL	36 089	6 025	42 114	37 374	7 643	45 017	41 610	101%	108%
PL	22 068	2 638	24 706	23 918	2 204	26 122	29 843	83%	88%
PT	8 720	1 027	9 747	8 528	1 256	9 784	14 235	68%	69%
RO	9 170	806	9 975	8 927	706	9 633	11 412	87%	84%
SK	8 282	429	8 710	8 444	717	9 162	4 711	185%	194%
SI	3 200	282	3 482	3 029	242	3 271	3 049	114%	107%
ES	28 584	6 327	34 911	27 952	3 515	31 466	57 376	61%	55%
SE	19 825	3 718	23 544	19 448	4 172	23 620	36 642	64%	64%
UK	40 747	6 140	46 887	43 116	13 025	56 141	128 299	37%	44%
Sum	505 660	85 710	591 369	511 080	84 083	595 164	903 984	65%	66%

Source: EUROSTAT, ComExt, balance of payments, main national accounts tax aggregates and own calculations.

Table 4.6 Potential VAT payments sent for goods and services trade compared to VAT revenue 2011, in million EUR

	Import data			Export data			VAT revenue	Payments/revenue	
	VAT payments sent			VAT payments sent				import data	export data
	Goods	Services	Total	Goods	Services	Total			
AT	17 389	2 676	20 066	16 797	3 303	20 101	23 447	86%	86%
BE	41 177	4 365	45 542	44 135	6 256	50 391	26 021	175%	194%
BG	2 240	349	2 590	2 422	258	2 680	3 352	77%	80%
CY	389	594	983	115	293	408	1 517	65%	27%
CZ	18 540	1 446	19 986	19 273	1 451	20 725	10 994	182%	189%
DK	9 007	2 154	11 161	9 136	3 172	12 308	23 870	47%	52%
EE	1 684	267	1 951	1 713	356	2 070	1 363	143%	152%
FI	6 822	1 169	7 992	6 073	1 234	7 307	16 915	47%	43%
FR	44 662	8 417	53 079	44 552	7 619	52 171	140 506	38%	37%
DE	117 141	14 778	131 919	117 334	10 414	127 748	189 920	69%	67%
EL	2 003	1 031	3 034	1 947	1 325	3 272	15 027	20%	22%
HU	10 905	1 207	12 112	11 794	1 182	12 976	8 517	142%	152%
IE	10 078	4 080	14 158	7 500	6 041	13 541	9 782	145%	138%
IT	37 254	4 112	41 366	39 217	4 089	43 306	98 557	42%	44%
LV	1 390	216	1 606	1 258	191	1 449	1 368	117%	106%
LT	2 301	404	2 705	2 388	298	2 686	2 444	111%	110%
LU	2 548	3 064	5 612	2 340	2 293	4 633	2 690	209%	172%
MT	265	427	692	206	252	458	520	133%	88%
NL	62 105	9 312	71 417	62 601	9 558	72 159	41 610	172%	173%
PL	19 481	2 183	21 664	20 348	2 588	22 935	29 843	73%	77%
PT	5 549	876	6 424	6 001	1 176	7 176	14 235	45%	50%
RO	5 693	713	6 406	6 271	813	7 083	11 412	56%	62%
SK	9 230	821	10 051	10 089	369	10 458	4 711	213%	222%
SI	2 958	299	3 257	3 427	354	3 781	3 049	107%	124%
ES	24 366	3 452	27 818	25 732	5 381	31 112	57 376	48%	54%
SE	15 783	3 089	18 872	14 835	3 553	18 388	36 642	52%	50%
UK	34 702	14 207	48 909	33 576	10 265	43 842	128 299	38%	34%
Sum	505 660	85 710	591 369	511 080	84 083	595 164	903 984	65%	66%

Source: EUROSTAT, ComExt, balance of payments, main national accounts tax aggregates and own calculations.

5 The number of firms involved in intra-EU trade

5.1 The goals and scope

The purpose of this section is to estimate the number of firms involved in intra-EU trade. These are the firms that would be affected by a change in the EU VAT system towards a system in which suppliers levy the VAT of their customers in other EU countries. We are not only interested in the absolute number of firms, but also in the share of all EU firms. Moreover, it is useful to know in which sectors the firms are active. Firms active in EU trade are very diverse. From the international trade literature we know that some of them are very large, exporting and importing are major activities and these firms are active in many countries and sell many products. For most exporting firms foreign sales form only a minor part of their turnover. This implies that a change in the VAT system also affects firms in different ways. We will therefore also present details on the distribution of the values of exports and imports in euros and as share of the turnover of exporters and importers. Of course changes in the VAT system could stimulate non-trading firms to export to other EU countries or import from these countries. Because changes in the VAT system affect the compliance costs of the VAT firms could possibly change their behaviour. The calculations in the section do not take account of this behaviour. The dynamic nature of a different VAT legislation is ignored.

Data on the number of trading firms are not readily available. Many scientific studies using international trade data at the firm level mention the number of exporters (often in goods trade) but do not distinguish between EU and non-EU exporters. Data from statistical offices do also not make this distinction, although there are some exceptions, like Portugal. Therefore we need firm level data by country and in most cases international transaction data of these firms to distinguish EU and non-EU countries (as destination or origin country). These data are normally collected by national statistical offices, central banks and customs agencies. Typically the imports from non-EU countries and exports to non-EU countries are recorded at the custom offices. Because of the internal market, intra-EU trade transactions are not recorded since 1992. Since total intra-EU exports and imports have to be known by the authorities because of VAT, statistical offices request firms to specify the value of merchandise products, next to the origin of imports and destination of exports (see also Section 2.1). There are thresholds for exports and imports to lower the administrative burden for firms with small trade values. These thresholds vary by member state. Services trade is recorded in the balance of payments statistics, often collected by central banks. Enterprise data on turnover and profits can be obtained from statistical offices.

There are several advantages of using the raw data from the various statistical offices for the analysis compared to data in the economic literature.

1. Most papers that examine trade data of individual firms do not distinguish between EU and non-EU trade.
2. The papers in the literature do not take account of the intrastat threshold and ignore smaller traders.
3. Most papers focus on exports, while imports have received less attention.
4. Many papers restrict the sample to firms with at least 10 or 20 employees.

The current data overcome most of these limitations, although we do not always have the number of firms below the intrastat threshold. Moreover we miss data on intra-EU services exporters and importers as is also the case in the literature.

The way in which the trade data are recorded and organised has various implications:

- In all cases data are confidential (even if names of firms and addresses are anonymous) and access to data is often limited to a specific group of researchers and/or at request for specific research purposes. Moreover, quite often data are only accessible upon location or via remote access.
- Because of the confidentiality reasons there is no common harmonized database. We had to approach groups of researchers by country.²⁸ Recently, Eurostat has made serious efforts to overcome this problem. They ask the number of intra-EU exporters and importers, the corresponding trade value and firm size from the member states.²⁹
- The collection of data for merchandise trade, services trade and enterprise data is organised in different ways within countries. This implies that merchandise and services trade data are not combined (except for Portugal) and that quite often trade and enterprise data are not perfectly integrated. As a consequence, figures are not complete for all participating countries.
- The data are gathered by surveying firms. This implies that all imports are B2B trade by definition, but that exports could include B2C trade.

5.2 The data and participating countries and institutes

Research institutes of 11 EU member states were able to provide data for this project. The countries are Denmark, Estonia, Finland, France, Ireland, the Netherlands, Portugal, Slovenia, Spain, Sweden and the UK. These countries represent about 45 percent of all EU-intra trade. This sample includes large and small countries and Northern and Southern countries. It is fairly representative, only the new member states are less well represented. The typical institute provides data for one of the years: 2008, 2009 or 2010. All institutes provide the number of exporters and importers of merchandise trade (agriculture, manufacturing and raw materials) at least above the EU intra trade threshold and the corresponding trade values. For some countries like the Netherlands, Denmark, Finland and Portugal the number of traders below the threshold of intra-EU trade can be counted. For other countries, like Estonia, Ireland and Slovenia it can be estimated. The numbers of service traders and the value of non-financial services trade (both exporters and imports) can be delivered for Portugal and the UK, although the UK data are from 2003.

²⁸ To some extent researchers have overcome these problems by providing the same amount of information for various countries; see Wagner et al. (2008). They are organized in the International Study Group on Exports and Productivity initiated by Joachim Wagner. We have asked mainly the contact persons of this group for participation in this project.

²⁹ These data are made available at <http://epp.eurostat.ec.europa.eu/newxtweb/setupdimselection.do>. We will use some of the results in this section. At the time of setting up this project the authors were not aware of this database. As a consequence some of the results delivered by the individual researchers and Eurostat will overlap.

Due to imperfect matches of balance sheet data of firms and their trade transactions turnover data cannot be delivered for all firms. For all countries self-employed are excluded in this analysis. At least one person has to be employed at the firm. Except for the UK, manufacturing firms are included in the sample although for some countries small firms are excluded or only randomly surveyed (such as the Netherlands). Firms in the agricultural and/or services sectors are sometimes not incorporated in the firm sample (Finland, France, Ireland, Netherlands, and Spain).

Table 5.1 Overview of the data bases

Country	Data source	Year	Trade	Firms	Threshold intra-EU export (k)	Threshold intra-EU import(k)
Denmark	Statistics Denmark	2008	merchandise	all	697 ^c	281 ^c
Estonia	Statistics Estonia	2008	merchandise	all	100	100
Finland	Statistics Finland & Customs	2010	merchandise	manufacturing & services	300	200
France	French Customs & INSEE	2008	merchandise	manufacturing commercial services	150	150
Ireland	Central Statistics Office	2008	merchandise	manufacturing, mining	635	191
Netherlands	Statistics Netherlands	2008	merchandise	manufacturing	900	900
Portugal	IES database ^a	2009	merchandise services	all	none	none
Slovenia	AJPES	2008	merchandise	all	200	85
Spain	Camerdata ^b	2010	merchandise	all	250	250
Sweden	Statistics Sweden	2008	merchandise	all	486 ^d	486 ^d
UK	HMRC ITIS	2010 2003	merchandise services	services	291 ^e	740 ^e

^a IES database is provided by National Institute of Statistics, Banco de Portugal, Ministry of Justice.

^b Consejo Superior de Cámaras Oficiales de Comercio Industria y Navegación de España.

^c based on average exchange rate in 2010: 1 euro = 7.456 DKK.

^d based on average exchange rate in 2010: 1 euro = 9.2544 SEK.

^e based on average exchange rate in 2010: 1 euro = 0.8578 GBP.

The data from Denmark are from 2008, which is the latest available date. Trade data includes only merchandise trade, but is not restricted to manufacturing firms. The Danish industry code is translated to the NACE code. The source of export and import data is intrastat. Firms report information on the

export and import transactions directly to Statistics Denmark on a monthly basis. Intra-EU trade is subject to a reporting threshold, which is set on an annual basis, such that the overall coverage of intra-EU trade amounts to 97 percent. In 2008, firms with an export value below 697 thousand euro or firms with an import value below 281 thousand euro were not obliged to report their intra-EU sales or purchases to Statistics Denmark. In 2008, the number of importers falling below the import threshold was 54 045, whereas the number of exporters below the export threshold was 20 198 and the overall number of firms below at least one of the thresholds was 59 299.³⁰ Data are reported in Danish Crowns.

The Estonian data are from the year 2008. Statistics Estonia provides data on merchandise trade and the firms. The business register includes 74 321 firms of which 59 160 are active. Because Estonia joined the EU only in 2004 the researcher has compared the number of exporting and importing firms before and after the introduction of the intrastat threshold of 100 thousand euro in order to estimate the number of firms below the threshold. These are included in the numbers. The trade values are in Estonian crowns, because Estonia joined the Euro zone only in 2011.

The data for Finland are from 2010. The data sources are the Finnish Customs Foreign Trade Statistics (data on merchandise goods only) and the Statistics Finland Business Register. The NACE revised 2 classification is based on the business register. There are 318 951 firms in the register. 200 068 of them can be linked to firms in the foreign trade statistics. The Finnish researchers have used the VAT data to identify firms that have exported to EU countries or imported from these countries but are not obliged to provide statistical information on intra-EU trade because of the intrastat threshold of 300 thousand euros for exports and 200 thousand euros for imports.

The French data come from the French customs and INSEE and are from the year 2008. These are merchandise trade data of exports and imports by firms in all economic sectors. The intrastat threshold is 150 thousand euro. The French confidentiality rules require that the values of any single cell including less than 11 observations are dropped. However, if a cell includes 0 observations, this information is reported.

The Irish data are derived from two data sources. The first is the Census of Industrial Production (CIP) conducted annually by the Central Statistics Office (CSO), response is compulsory. The firm (enterprise) population is firms with 3 or more persons engaged (in practice there are also a few firms with less than 3 persons engaged) in the mining, manufacturing and utilities sectors in Ireland (NACE rev2 10-38). The firms with 20 or more employees have to provide shares of exports to the UK, Euro zone and the rest of the EU as well as imports from these regions. These firms account for more than 95 percent of exports. Firms with less than 20 employees need to provide the share of exports to the UK. We use these data to calculate the number of traders which also include the small traders below the intrastat threshold. The second source is the intrastat VAT data from the Irish tax authorities. These data are used to calculate the export and import values. All data are from 2009.

³⁰ Source: Udenrigshandel og Betalingsbalance – Kilder og Metoder 2012, Danmarks Statistic.

The Dutch data come from Statistics Netherlands for 2008. This is a set of customs data extended with a survey across Dutch firms on international transactions of imported and exported goods. Each record is identified by the VAT-number. The dataset does not include intra-EU transactions of firms with total exports (or imports) below the intrastat threshold of 900 thousand euro, but it includes additional data from the Dutch Tax Authorities on the sum of all exports by firm, but the totals cannot be specified by EU destinations and products. The VAT numbers could not be linked to firms and sectors in the business register without losing much information. Therefore the information on export and import products is used to classify firms (we do not have firm turnover) by the products with the highest share of the firm exports or imports. For two-way traders the NACE 2 digit code which represents the highest share of firm exports is used. Because firm turnover is lacking, information on the relative export and import values with respect to turnover cannot be presented at the firm level. Using national account data this information can be presented at the sector level.

The data of Portugal are from 2009 and comprise intra-EU goods and services trade. Firm-level data used refers to the survey “*Informação Empresarial Simplificada*” (IES) jointly collected, by Banco de Portugal, Portuguese Statistical Institute (INE) and Portuguese Ministry of Justice, from 2006 onwards. This survey includes data on balance sheet and income statement item, along with other variables such as external trade data for virtually all Portuguese firms, except for financial firms which are only partially included. In this survey firms are asked to provide trade data on intra- and extra-EU trade in goods and services. Therefore we do not need the international transaction data for each firm by country. The advantage is that the results are derived from a well integrated database without missing data due to linking databases. Due to confidentiality reasons, information regarding some sectors is not reported. The confidentiality threshold is a minimum of 3 firms or 75 percent of sales of goods and services at the 2 digit-level in NACE.

AJPES (Agency of the Republic of Slovenia for public legal records) covers virtually the whole population of firms. All business entities publicly or privately owned are required by law to report their balance sheet and other accounting data annually to AJPES. The database excludes only those small sole proprietors that operate under standard cost accounting (less than 50.000 euro annual turnover). Due to confidentiality reasons data are not reported for cells with less than three firms. The trade data cover only goods trade. The intrastat threshold value was 200.000 euro for exporting flows and 85.000 euro for importing flows in 2008. The share of underreported intra-EU flows is estimated by looking at the dynamics of the share of firms below the cut-off prior to Slovenia’s EU accession. The aggregate share of firms below the cut-off for both exports and imports was approximately 55 percent in 2004. Given that some firms below the cut-off are reporting their trade flows even though they do not have to, the actual percentage of non-reporting firms is somewhat lower. The researchers estimate that about 50 percent of all firms report their trade with the EU and the rest do not due to the cut-off values.

The Spanish data are for the year 2010 and come from the Consejo Superior de Cámaras Oficiales de Comercio Industria y Navegación de España. These are goods trade data for agriculture, mining and quarrying, manufacturing and electricity, and gas (based on the product code). The information corresponds to the 250.000 € intrastat threshold. However, the researchers have been able to gather

some additional information. Out of the 28.945 exporters, 11.245 have exports below this compulsory threshold. The information on export and import products is used to classify firms (we do not have firm turnover) by the products with the highest share of the firm exports or imports. For two-way traders the NACE 2 digit code is used that represent the highest share of the firm exports. Because firm turnover is lacking, information on the relative export and import values with respect to turnover is only presented at the sector level based on national accounts data.

Statistics Sweden provides the data for Sweden for 2008. It is the Utrikeshandel dataset merged with FAD. The trade data contain only merchandise trade. The currency is Swedish Krona. The intrastat threshold is 467 thousand euro.

The UK data come from the tax authorities (HMRC) and the statistics office (ONS). The goods trade data are from 2010. The data on intra-EU goods trade come from a survey of VAT-registered businesses and account for approximately 95 percent of all intra-EU imports and exports. For confidentiality reasons cells are empty for less than 30 observations. The data on intra-EU goods trade is not available at the industry level. The researchers decided to break the figures down by product codes (SITC). The correspondence between SITC and NACE is not straightforward it has been done provisionally by CPB for the comparison with other countries. One of the problems is that firms often export multiple goods which cover multiple industries. This is why, for example, there are 20,998 exporting firms in total, but the sum of firms exporting to each 1-digit SITC is over 40,000. Clearly, many firms export products in more than one SITC. The data on services trade come from a survey, called International Trade in Services (ITIS). Unfortunately the most recent year which ONS have made available on a reliable basis is 2003. The ITIS data is missing for all cells with less than 10 observations. The ITIS data can be linked to information on the firm itself, so we can provide breakdowns at the NACE sector level. The survey excludes financial services. It is difficult to assess what fraction of total services trade is covered by the data, probably a large fraction of total trade is measured, but the number of traders is probably only a small fraction of all traders.

With respect to exports and exporting firms we run the possibility of overestimating the numbers because B2C trade is included. This is hardly a problem for the number of exporting firms. First, we know from experience that most exporting firms do also import which is by definition B2B trade. Second, if firms trade directly with consumers they also trade with firms in most cases. It could be different for retailers for example. The possibilities for B2C trade differ by sector.

5.3 The number of intra-EU traders

Because many firms export and import goods, it is useful to distinguish exporters and importers from two-way traders. Simply adding up the number of firms involved in exporting or importing goods (or services) would overestimate the number of firms involved in intra-EU trade. Two-way traders for goods are defined as intra-EU exporters and importers of goods. Two-way traders are a subgroup of exporters and importers. Traders are defined as firms importing from and or exporting to other EU countries. The number of traders thus equals the number of intra-EU exporters and importers minus the two-way traders (to correct for double counting). As we will show the number of two-way traders

is very important and it is one of the big advantages of the firm data from the 11 countries for we have access that these data include the number of two-way traders compared to the Eurostat data.

Table 5.2 presents the number of intra-EU exporters, importers, two-way traders, traders and the share of traders in the total firm population for 11 countries for which we have data access. The figures for the different countries are difficult for compare. First of all, due to the intrastat threshold for observing intra-EU trade, not all trading firms are counted. In some countries statistical offices do collect the information of all firms, like Portugal, Finland, and Ireland. However, for Ireland we miss a large share of intra-EU trade in goods exported and in particularly imported by firms in services sectors. For Estonia and Slovenia the number of firms below the threshold is estimated. For the Netherlands we have estimated the number of firms with exports or imports below the threshold. Taken all countries together the number of intra-EU traders in goods trade is underestimated. For the countries Denmark, Finland, Netherlands and Slovenia we have the number of EU-traders above and below the intrastat threshold. For Slovenia it is estimated that there are as many small traders below the threshold as there are above the threshold. Underlying data for Denmark, Finland and the Netherlands suggest, however, that the larger share of firms trading with other EU countries has trade values below the threshold. This share could amount to 80 percent of all intra-EU trading firms. In terms of the export and import value it is at most five percent based on the requirements of Eurostat. The intrastat threshold varies by country and the distribution of small and large firms also varies and it is therefore not possible to draw any general conclusions from ratio of EU-traders above and below the threshold. It is probably not an overestimation to state that the number of EU-traders in France, Sweden and the UK would be at least three times as large if small traders could be included. For Spain this will be probably lower, because a share of the small traders is already included in the data of Table 5.2.

The numbers of firms are based on different samples which in the case of Sweden even include the self-employed. For Ireland we only have firms in the mining, manufacturing and utilities sectors. These firms account only a small share of the Irish firm population (less than ten percent).

In spite of these problems we detect some patterns. First of all, we have nearly twice as many importing firms than we have exporting firms and about a third of the importing firms are two-way traders.³¹ The majority of exporters also imports from other EU-countries. These numbers imply that a large majority (about 80 percent) of all firms trading with other EU countries are importers and about 40 percent are exporters. For seven countries the number of EU-traders also includes the small traders. These are Denmark, Estonia, Finland, Ireland, the Netherlands, Portugal, and Slovenia.³² The pattern corresponds largely to the openness and economic size of the countries. The Netherlands has the largest number of EU traders followed by Finland, Denmark and Portugal. The numbers for the smallest countries, Estonia and Slovenia, are substantially lower.

³¹ The UK is an exception with more intra-EU exporters than importers. The main reason for this is that the intrastat threshold for the import value is much higher than for the export value while in most countries the values of the thresholds for exports and imports are identical.

³² For Ireland we have also the number of small traders, but for a very limited set of firms.

Table 5.2 The number of firms trading goods with other EU countries

Country	Exporter	Importer	2-way trader	Traders affected	Active firms ^a	Share traders
Column	(1)	(2)	(3)	(4)	(5)	(6)
Denmark	24 343	62 230	18 134	68 439	124 770	54.9
Estonia	2 365	4 063	1 504	4 924	59 160	8.3
Finland	12 414	53 987	6 794	59 607	318 951	18.7
France	41 319	68 065	28 298	81 086	8 120 005	1.0
Ireland	2 327	3 067	2 005	3 389	5 011	67.6
Netherlands	83 108	134 430	58 567	158 971	1 021 245	15.6
Portugal	21 526	54 467	15 465	60 528	311 678	19.4
Slovenia	3 752	12 506	2 918	13 340	52 035	25.6
Spain	28 078	51 247	17 159	62 166	3 250 576	1.9
Sweden	7 662	12 467	4800	15 329	887 729	1.7
UK	20 998	18 886	9 446	30 438	1 758 431	1.7
total	247 892	475 415	165 090	558 217	15 909 591	3.5

Source: project data, see Table 5.1

Note that the numbers in column (4) are the sum of columns (1) and (2) minus column (3).

Note that the numbers in column (6) are the ratios of the numbers in columns (4) and (5).

^aThe definition of active firms varies by country. For most countries the number comes from the business register, but for Ireland it is the number of firms in the database mentioned in Section 5.2 and excludes most non trading firms. Moreover not every country registers sole proprietors and self employed well in the business register. E.g. the Danish number represents all firms with at least one full time employee. The French, Dutch, Finnish, Swedish and UK numbers include also sole proprietors. For Spain firms in agriculture are not included.

Only for Portugal and the UK we have the number of intra-EU traders in services. These are mainly commercial services, but do not cover (all) financial services. 32 603 Portuguese firms export or import services. Nearly 15 thousand of these firms also imports or exports goods. In total the number of EU-traders is about 30 percent higher. In 2003 there were about 5 thousand UK firms trading in services. These firms account for a large share of services trade (excluding financial services) but most traders are missing. Moreover, the data samples on goods for 2010 and services for 2003 are hardly comparable. Therefore it is not possible to identify firms trading goods and services. Also for services most small traders are missing. One could conjecture that the number of EU traders of services is much smaller than the traders in goods which is also suggested by the values of goods and services trade reported in the national accounts. Extrapolating from these data an additional 30 percent of firms as intra-EU traders due to services trade appears a reasonable estimate.

A disadvantage of the data in Table 5.2 is that it does not cover all EU countries. This is different for the Eurostat data. Table 5.3 presents the number of intra-EU exporters and importers for 2009. We only miss results for Belgium and Ireland. There are about one million intra-EU exporters and 2 million importers. Most exporters come from Germany followed by Italy, United Kingdom, Czech Republic and the Netherlands. Compared to its size the number of French exporters seems to be

relatively low and that of the Czech Republic relatively high. Small countries, like Malta, Cyprus and Luxemburg have only a few thousand goods exporters. That pattern of intra-EU goods importers is similar tot that for exporters. Germany, Italy, United Kingdom, the Netherlands and Portugal have the largest number of importers. The number of French importers is relatively low, while it is high in the Czech Republic and Portugal.

Table 5.3 The number of firms trading goods with other EU countries (Eurostat)

Country	Exporting firms	Importing firms
Austria	37 767	139 095
Bulgaria	10 847	21 833
Cyprus	1 784	9 640
Czech Rep.	84 418	83 260
Denmark	19 560	52 263
Estonia	7 247	10 737
Finland	10 764	36 358
France	46 392	71 284
Germany	219 315	437 791
Greece	11 911	30 873
Hungary	30 861	47 256
Italy	147 690	282 111
Latvia	8 677	19 429
Lithuania	9 190	16 615
Luxembourg	5 825	21 928
Malta	548	4 505
Netherlands	81 644	127 434
Poland	50 637	74 585
Portugal	34 567	116 284
Romania	19 392	60 205
Slovakia	24 249	60 698
Slovenia	10 025	31 693
Spain	29 444	55 351
Sweden	29 947	68 114
United Kingdom	105 102	126 237
Total (EU25)	1 037 803	2 005 579

Source: Eurostat data for 2009

There are twice as many intra-EU importers than exporters of goods. We have a similar ratio in Table 5.2. A disadvantage of the Eurostat data is that the number of two-way traders is not calculated. Adding the number of importers and exporters would overestimate the number of intra-EU traders. The advantage of the data of 11 countries in Table 5.2 is that these include the number of two-way traders. Table 5.2 suggests that about two-thirds of all exporters are also importers of goods from

other EU countries. Applying this number to the results in Table 5.3 suggests a number of nearly 2.4 million intra-EU traders, except for Belgium and Ireland. Note that Belgium and Ireland are responsible for about 11 percent of all intra-EU trade in goods. If the number of intra-EU traders corresponds to the size in trade value we would expect that there are about 2.7 million traders in goods.

The numbers for most countries in Table 5.2 are comparable to those in Table 5.3. The numbers are not identical for various reasons such as the year of the data, different data sources and the method the numbers of firms are calculated in particular related to the intrastat threshold. The results of France, the Netherlands and Spain differ only by a few percent between both tables. For Estonia, Portugal, Slovenia, Sweden and the UK the differences are large. For Sweden and the UK that can be explained by the number of intra-EU traders below the intrastat threshold. These firms are included in Table 5.3 but not in Table 5.2, because the researchers had no information on these firms. For Portugal the data sources are different and for Slovenia it was estimated that number of firms below the threshold was about the same as above. The estimate is according to Table 5.3 clearly too low, also Eurostat (2010) mentions that the number of traders below the threshold forms the majority, although their contribution to the value of trade is only a few percent.

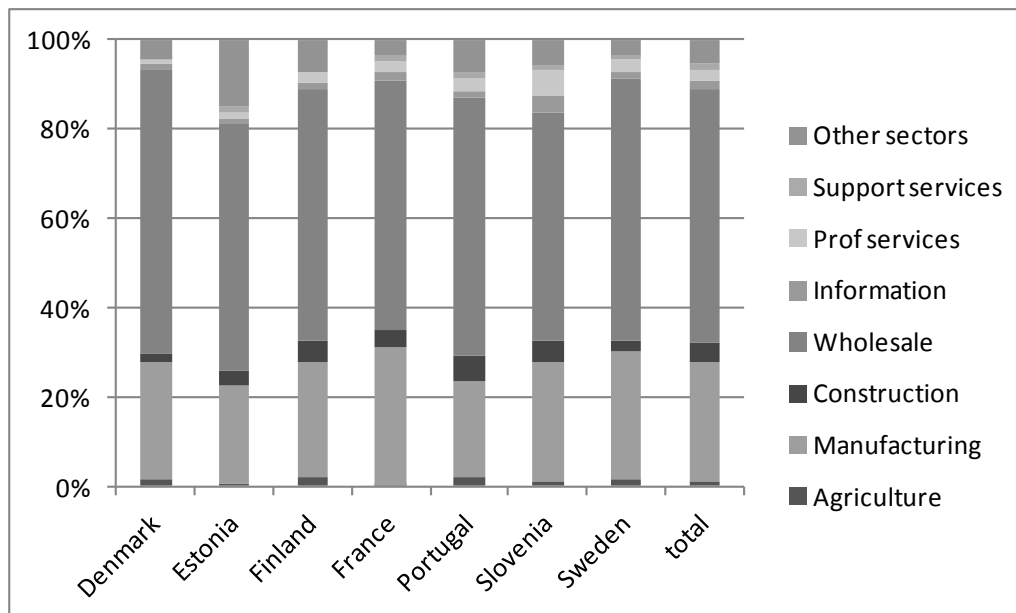
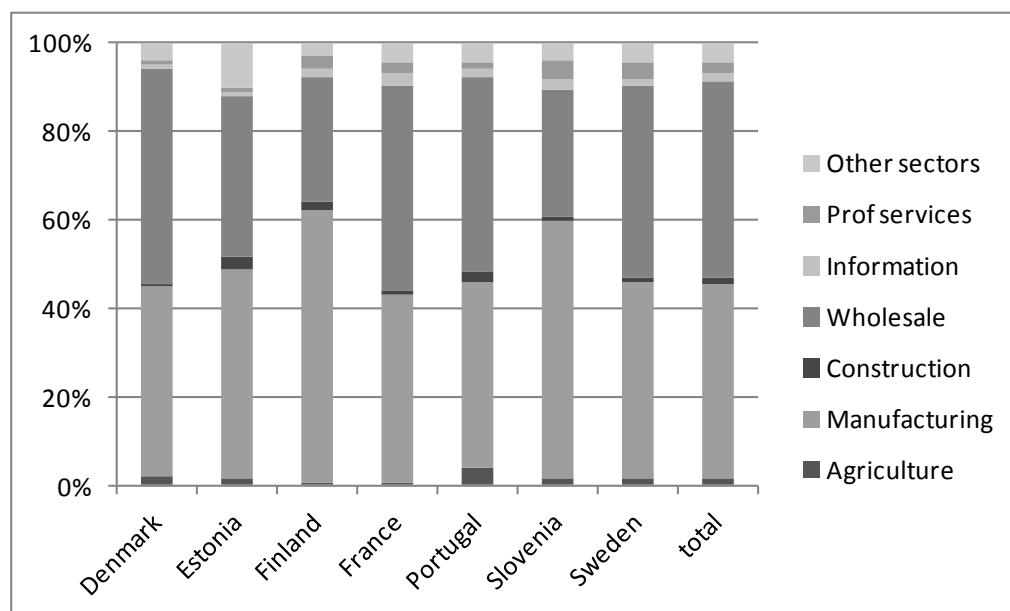
About 85 percent of goods exporters are by firms in manufacturing or wholesale and retail trade.³³ These conclusions are based on comparisons of the results of Denmark, Estonia, Finland, France, Portugal, Slovenia and Sweden.³⁴ Figure 5.1 also presents the others sectors responsible for more than 1 percent of the exporting firms such as agriculture, construction, information services and professional services.³⁵ Most of the goods importing firms are in the wholesale and retail sector as the second panel in Figure 5.1 shows. A significant part comes also from manufacturing but the wholesale sector clearly dominates as the most important sector for importing. About 4 percent of the intra-EU importing firms are in the construction sector and two percent in professional services and information services.

³³ Annex 6 provides a full list of the NACE sectors.

³⁴ Because the NACE classification for the Netherlands, Spain and UK is based on traded goods and not the business register, we have not identified services sectors. For Ireland we have a sector classification, but it is only available for agriculture, mining and manufacturing.

³⁵ Annex 8 presents the number of firms for all NACE sectors for all eleven countries. The accompanying excel files present also the numbers of firms at the two digit sector NACE level.

Figure 5.1 The distribution of intra-EU exporters (upper chart) and importers (lower chart) by NACE sector



For trade in services the sectoral pattern is different. The exporting Portuguese firms are in manufacturing, construction, wholesale and retail trade, transport and storage, and professional, scientific and technical activities. In the UK, business services (including professional activities), wholesale and retail and manufacturing generate the services exports. For services imports the sectors construction, transport and storage and professional and technical activities are important in Portugal, while in the UK firms in manufacturing and business services are responsible for most services imports.

5.4 The value of intra-EU trade

The value of goods exports varies from 6 billion euro in Estonia to 202 billion euro in France. The import values are of similar size, ranging from 8 billion to 222 billion euro. Note that these numbers are derived from firm level data and do not match the numbers in the national accounts exactly for reasons discussed earlier. The large gap between the values of Irish exports and imports is remarkable. One of the reasons for this gap is that we miss the goods imports from firms in the services sectors. Compared to turnover, the size of exports and imports varies from 10 to nearly 50 percent. France is the least open country in terms of the value of exports to GDP and has consequently the lowest value for the export to turnover ratio. This is line with larger countries being less open to trade than smaller countries. The Netherlands is the most open country based on the ratios of exports and imports to turnover.

Table 5.4 The absolute and relative trade value of firms trading with other EU countries

Country	Export value	Import value	Exports	Imports
unit	billion euro	billion euro	% turnover	% turnover
Denmark	43.1	41.1	0.43	0.41
Estonia	5.6	8.3	0.37	0.36
Finland	24.9	24.1	0.16	0.11
France	201.8	221.8	0.13	0.11
Ireland	38.5	8.0	0.44	0.09
Netherlands ^a	164.7	106.1	0.49	0.49
Portugal	25.7	36.0	0.20	0.24
Slovenia	9.8	14.6	0.36	0.36
Spain ^a	140.1	136.7	0.24	0.24
Sweden	68.1	68.5	0.34	0.19
UK ^a	161.3	214.2		
Total	883.7	879.2		

Source: project data, see Table 5.1

Note: Please note that figures reported for the aggregates do not necessarily coincide with official data, namely in terms of external trade of goods and services. This is due to miss-reporting, non-response thresholds and a different concept regarding exports and imports. In some countries the international trade transactions are reported when invoices take place, while the Intrastat database takes account of the actual shipping of goods³⁶.

^a We miss turnover data at the firm level to estimate the ratios of exports and imports to turnover as we do for the other countries. For Spain and the Netherlands we were able to use national account data at the sector level.

The intra-EU trade value in this paper represents nearly 900 billion euro which is about 40 percent of intra-EU trade in goods (in 2009). Based on the national accounts the value of intra-EU trade of the eleven countries for which we have firm level data is about 45 percent of the total value of intra-EU trade. Consequently, we miss about 15 percent of trade values using firm level data.³⁶

³⁶ Annex 8 presents the export and import values for all NACE sectors for all eleven countries. The accompanying excel files present also the export and import values at the two digit sector NACE level.

From the only country we have received data on goods and service trade for the same year, Portugal, we conclude that trade in services is substantially smaller than trade in goods. Services exports are a factor 3 lower than goods exports and services imports are a factor 5 lower than goods imports.

5.5 The distribution of intra-EU trade

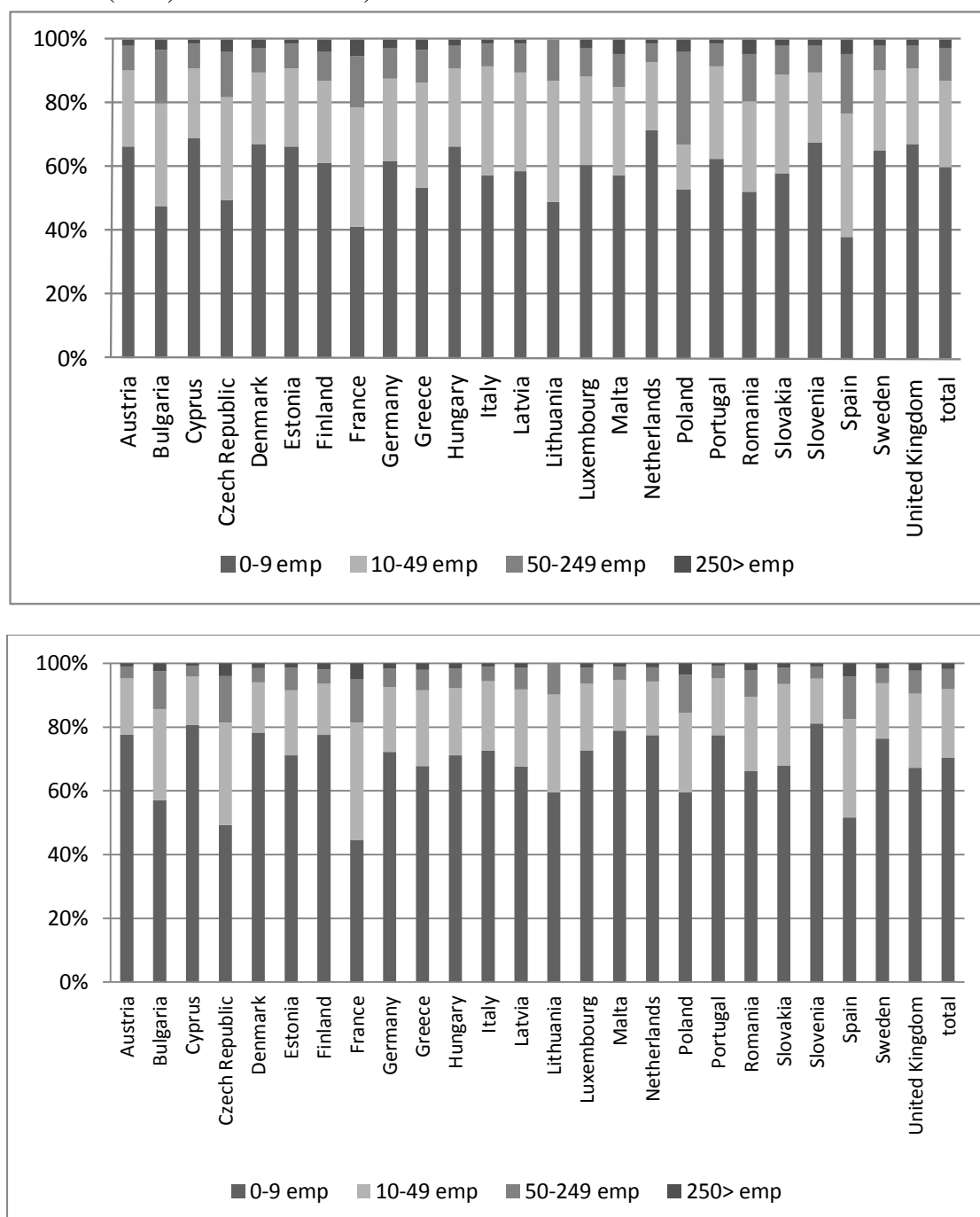
From section 5.4 we know that intra-EU traders are not evenly spread across sectors of the economy. Most of them are in manufacturing and wholesale. Another way to look at the distribution of intra-EU traders is by the size of the firms. It is common to distinguish very small firms (at most 9 employees)³⁷, small firms (10 to 49 employees), medium-sized firms (50 to 249 employees) and large firms (at least 250 employees). Eurostat provides data for nearly all EU countries, except Belgium and Ireland. Figure 5.2 presents the results for intra-EU exporters and importers. First of all, some countries cannot classify a large share of the traders such as the Czech Republic, Germany, Greece, Luxembourg and Slovakia. The fact the 30 percent of all German traders cannot be classified affects also the overall results (see total). Comparing the results with countries with only a few percent of unclassified firms suggests that most of the firms which are not classified in countries with a large unknown share are very small or small firms. On average about two percent of the importing firms are large firms. About ten percent are medium-sized and the rest are small firms. The majority of importers are very small firms. Among exporters the share of very small firms is even higher.

The distribution of exporters or importers by firm size is completely different than the distribution in terms of export or import value. Mayer and Ottoviano (2007) already conclude that exporting is for the happy few (large multinationals). The largest one percent exporters account for 45 percent of a country's export value. The largest five percent exporters account even for more than 70 percent of export value. Mayer and Ottoviano (2007) derive these results for a number of developed countries. Cebeci et al. (2012) report from the World Banks' exporter dynamics database, a data base of 45 developed and developing countries, that the largest five percent exporters generate 81 percent of the total export value on average. These observations are similar for the EU. Figure 5.3 presents this distribution of export and import values by very small, small, medium-sized and large firms in terms of employees for the year 2009.³⁸ Ignoring that about ten percent of the trade value cannot be classified large firms are responsible for 45 percent of all exports and 40 percent of all intra-EU imports in goods. Medium sized firms generate 20 percent of intra-EU goods trade and very small firms only about ten percent.

³⁷ These very small firms are sometimes called micro firms.

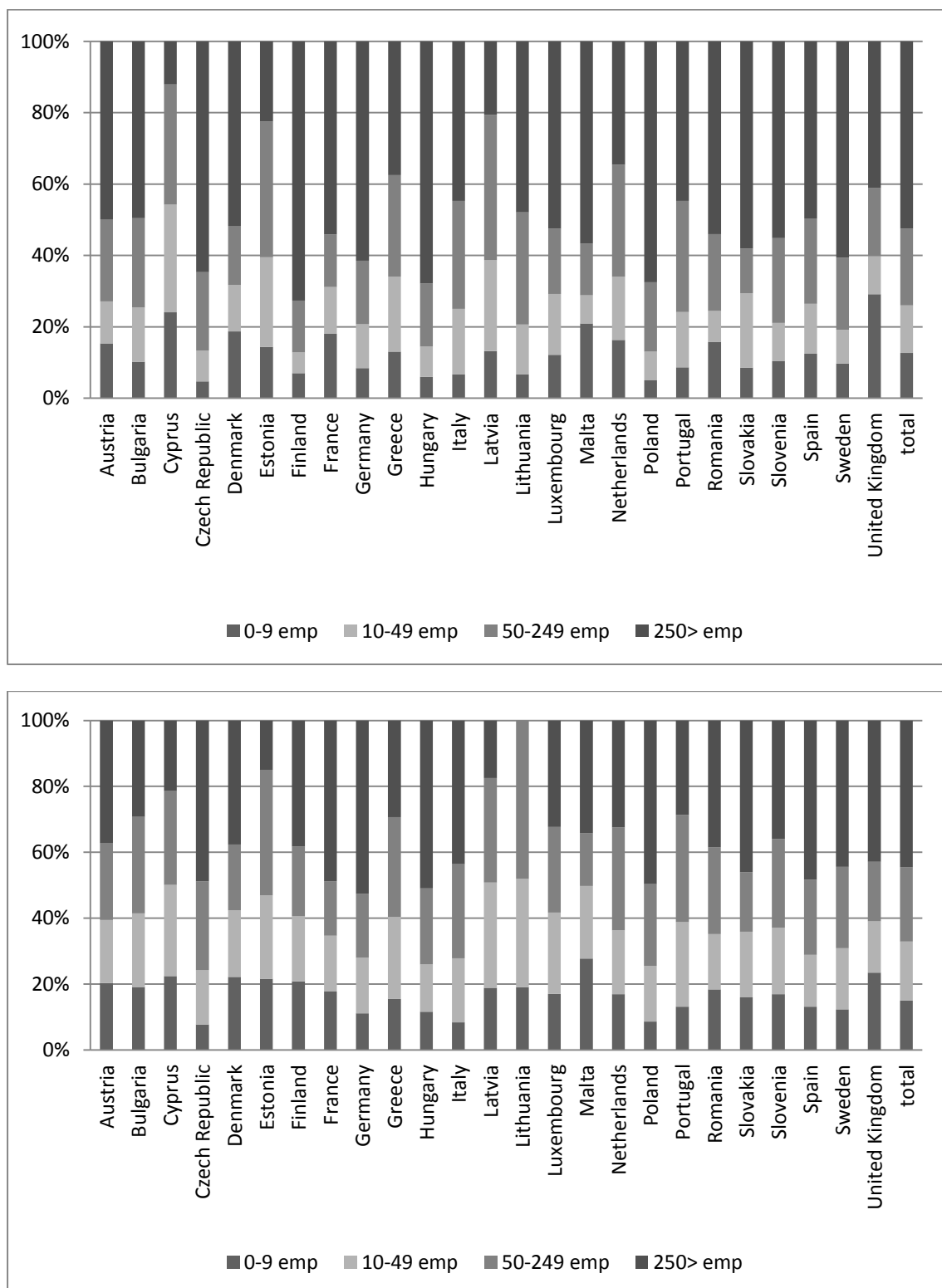
³⁸ The underlying data of Figures 5.3 and 5.4 are presented in Annex 7.

Figure 5.2 The distribution of intra-EU exporters (upper chart) and importers (lower chart) by firm size (2009, source: Eurostat)³⁹



³⁹ Note we have excluded the category unknown (firm size missing) for a better comparison between the countries. On average the share of unknown exporters is 11 percent and for importers it is 14 percent, but the numbers varies from one percent for France to about 20 percent for Germany.

Figure 5.3 The distribution of intra-EU export (upper chart) and import (lower chart) value by firm size (2009, source: Eurostat)



From the results in Figures 5.2 and 5.3 we conclude that the average export or import value heavily depends on the size of the firm. It is much larger for large firms than for very small firms. About 50 percent of exporting firms are very small firms, while these firms generate only 10 percent of the intra-EU export value. Roughly stated, their export values are about 20 percent of the average export value. The large firms which account for about two percent of the population of exporting firms generate about 45 percent of all exports. Their export values are thus about 20 times the average export value. The value of intra-EU exports and imports is very skewed between firms. If a finer classification of firms is used this skewness becomes even more striking. Figure 5.4 presents the export (import) values of nine firms related to average firm exports (imports) by country. For a value below 1 on the vertical axis, the export (import) value of the firm is lower than the average export (import) value. For a value above 1 firms have above average export (import) values. On the horizontal axis nine firms are chosen from the export (import) value distribution. The expression p10 represents a firm with an intra-EU export (import) value at which 10 percent of the firms have smaller export (import) values and ninety percent have higher export (import) values. p20 is the firm with an export value at which twenty percent of the firms have smaller export values etc. p50 represents the firm with the median export value. If all firms had average export values the lines would be horizontal at one (likewise for importers).

Figure 5.4 shows that the export values of about 40 percent of the exporting firms are less than ten percent of the average (p40). Less than twenty percent of the largest exporting firms (above p80) export more than the average exporter. The distribution of exports over firms is thus skewed. In Ireland and the UK even firms at the bottom end of the largest ten percent exporters have below average export values. In Finland, France and Portugal these firms have just above the average exports value in their countries. The results for the distribution of imports show a similar pattern. About forty percent of the firms import less than ten percent of the average and less than twenty percent import more than the average. In Portugal and the UK less than ten percent of the largest importers have above average import values.

The distribution of firms engaged in intra-EU trade as share of their total turnover is also skewed.⁴⁰ Figure 5.5 shows the distribution of export (figure above) and import (figure below) values compared to turnover for the firms at the percentiles of the export or import value distribution. The pattern differs across countries. In France, Ireland and Portugal for more than half of the exporting firms, the values of their exports is less than ten percent of their turnover. However, in Denmark and Slovenia this share is substantially higher. In nearly all countries foreign sales dominate the turnover only for the top ten to twenty percent of the exporters France is an exception. Even for the larger exporters, exports do not dominate their sales. For imports the curves are less skewed than for exports reflecting less heterogeneity. In Slovenia, smaller firms import more as a share of their turnover than firms in other countries. Moreover we find that the large firms import a smaller share of their turnover than they export. This is not surprising, because a part of the inputs in production are locally sourced.

⁴⁰ We miss the Netherlands, Spain and the UK because of the lack of turnover data.

Figure 5.4 The distribution of the value of intra-EU exports (upper chart) and imports (lower chart) over firms (related to average exports or imports)

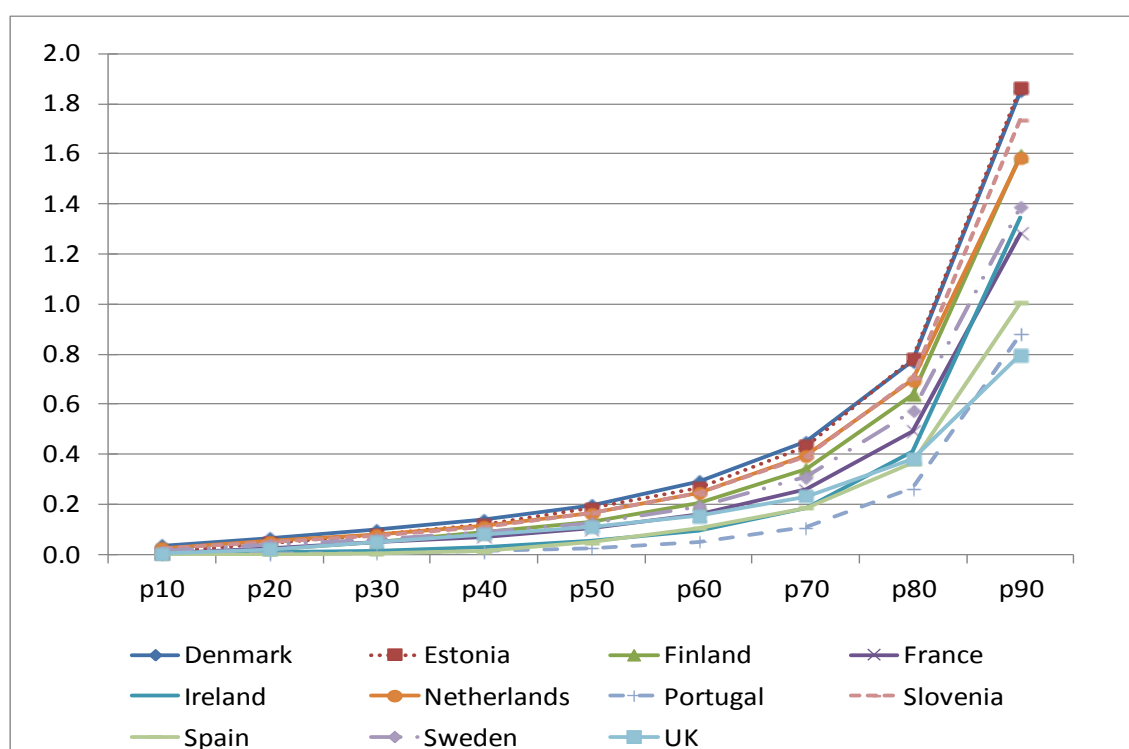
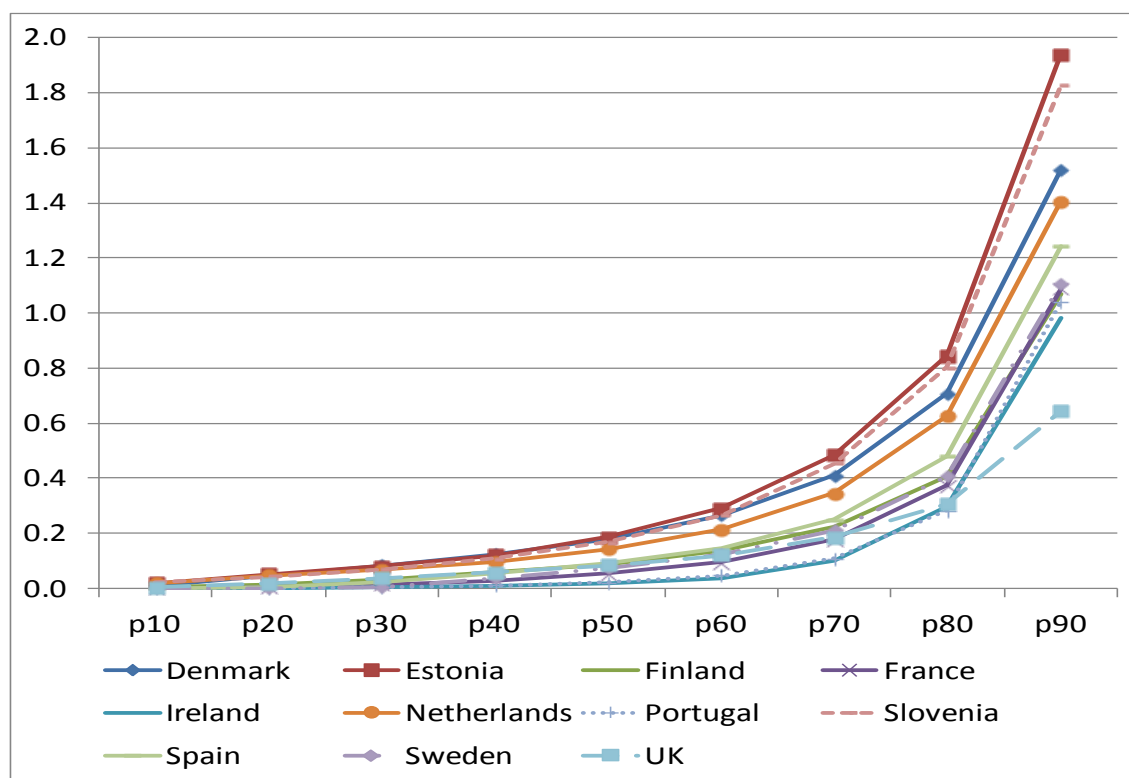
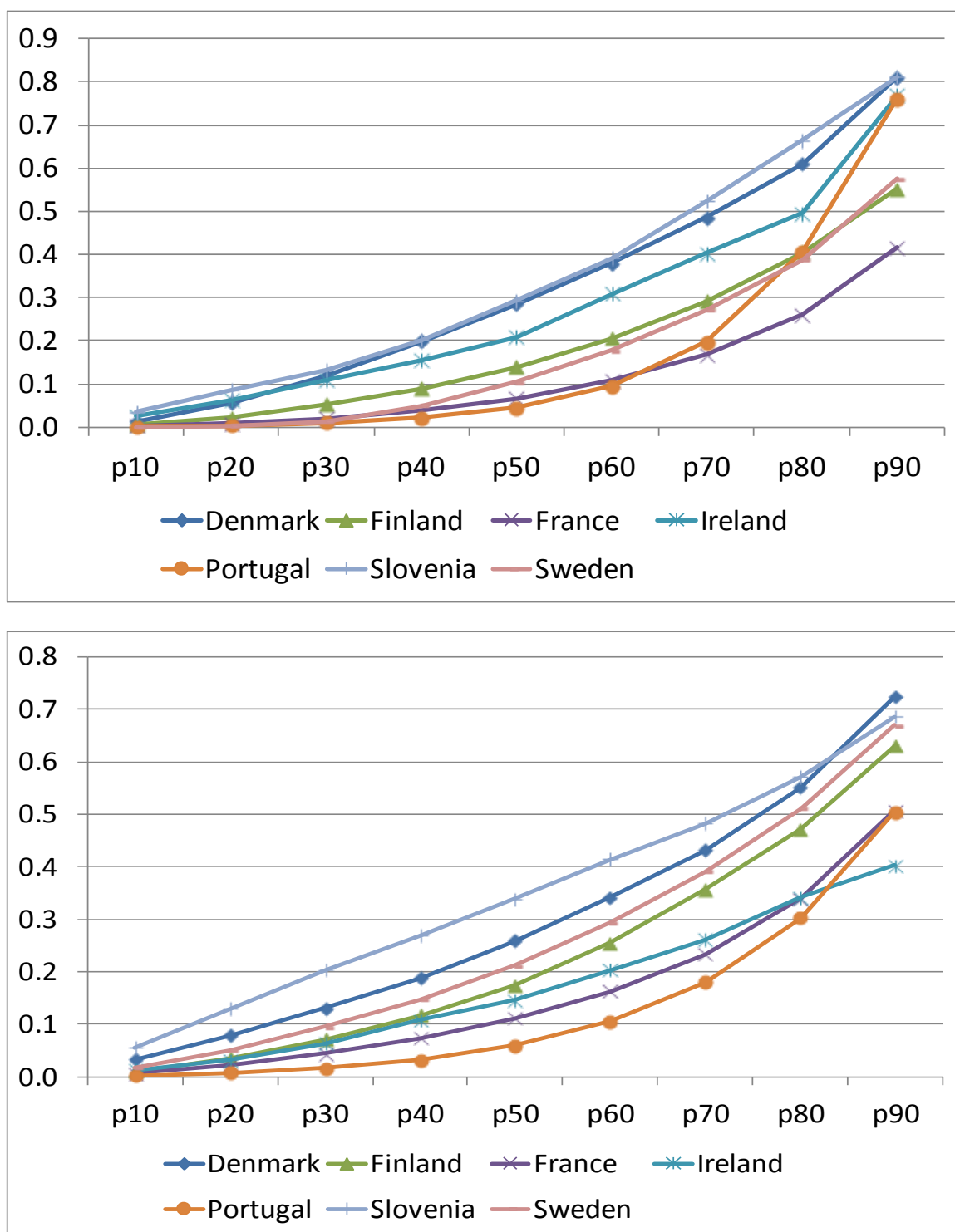


Figure 5.5 The distribution of the value of intra-EU exports (upper chart) and imports (lower chart) over firms (related to turnover)



5.6 The total number of intra-EU traders in the EU

In section 5.3 we presented the results from firm level data of 11 countries. The advantages of using the raw data from the various statistical offices above secondary data in the literature are obvious. Most papers that examine trade data of individual firms do not distinguish between EU and non-EU trade. Second, these papers do not take account of the intrastat thresholds. Third, most papers focus on exports, while imports receive less attention. Fourth, many papers restrict the sample towards firms with at least 10 or 20 employees. The data used in this study overcome most of these limitations, although we do not have always the number of firms below the intrastat threshold (France, Spain (to some extent), Sweden, UK). The main limitation is that we miss data on intra-EU services exporters and importers for most countries as is also the case in the literature.

The use of Eurostat data solves the first of these two problems. However, Eurostat does not provide the number of two-way traders so it is difficult to disentangle intra-EU exporters which also import from those which do not import from other EU countries. This is a serious problem because Table 5.2 suggests that about two-thirds of all exporters are also importers of goods from other EU countries. Applying this number on the number of intra-EU goods exporters in all countries suggests that about 700 thousand exporters are two-way traders. Then it follows from Table 5.3 that there are nearly 2.4 million intra-EU traders: 0.7 million two-way traders plus 0.35 million exporters (which do not import) plus 1.3 million importers (which do not export). These numbers are summarized in Table 5.5. We only miss data for two EU countries: Belgium and Ireland. These two countries are responsible for 11.5 percent of all intra-EU trade in goods. If the number of intra-EU traders corresponds to the value of trade we would expect that there are about 2.7 million traders of goods of which about 1.2 million are exporters. This number could be about 100 thousand firms too much or too low, but existing data on the number of Irish and Belgium traders are not a good proxy to reduce this uncertainty. The number of Irish firms in Table 5.2 is much too low to be representative for all Irish goods traders. It ignores all non-manufacturing firms exporting or importing goods which are probably ten to twenty firms (Haller et al, 2013). A number of Belgium (intra and extra-EU) exporters is mentioned in the World Bank Exporter Dynamics Database (Cebeci, et al, 2012). The number of 23 thousand exporters on average between 2006 and 2008 does not include exporters below the intrastat threshold at all.⁴¹ The number of Belgium exporters seems to be low, as also follows from the high average export value in Cebeci, et al. (2012).

The estimate of nearly 2.7 million intra-EU traders is based entirely on goods trade data. Trade in services is missing. We only have some information for the UK in 2003 and for Portugal in 2009. The latter data are more promising because data on trade in goods and services are integrated in one database. There are about 32.6 thousand Portuguese intra-EU traders in services. 20 percent of them are two-way traders. Nearly 50 percent of the traders in services also exports or imports goods and is already defined as intra-EU trader in goods. Only 16.8 thousand Portuguese traders of services which do not trade goods have to be added to the total number of Portuguese intra-EU traders, this is about

⁴¹ Muûls and Pisu (2009) report similar findings as the World Bank. Of 107 180 firms with at least one employee in 2004, 77 percent of these firms do not trade, 18.7 percent are importers and 15 percent are exporters. The share of two-way traders is 10.7%. 9 050 trading firms in the customs data set are not included in the firm total. This suggests that the number of exporters corresponds to Cebeci et al. (2012), although firms without employees are excluded as are all traders below the intrastat threshold.

30 percent (see Table 5.3). This share corresponds to the share of intra-EU services trade compared to intra-EU goods trade (in 2009).⁴² This is coincidence and we do not want to suggest that firms trading in services export or import the same values as firms trading in goods.

Apart from the data for Portugal we do not have comparable data for other countries on the number of intra-EU traders in goods and in services. In order to estimate the number of intra-EU traders we raise the total of traders in goods (nearly 2.7 million firms) by 30 percent, which are about 0.8 million services traders. The total amount of intra-EU traders is thus nearly 3.5 million firms. 1.5 million of these firms are intra-EU exporters and 3 million firms are intra-EU importers.

Table 5.5 The number of intra-EU traders (in million firms)

Intra-EU traders:	Exporters	Importers	Two-way traders	Traders affected
EU25 goods assumption	1.04	2.01	0.69	2.35
		<i>add 11.5% to EU25 goods</i>		
EU27 goods assumption	1.17	2.27	0.78	2.66
		<i>add 30% to EU27 goods</i>		
EU27 goods and services lower band assumption	1.53	2.95	1.02	3.46
		<i>add 20% to EU27 goods</i>		
EU27 goods and services upper band assumption	1.41	2.72	0.94	3.19
		<i>add 40% to EU27 goods</i>		
EU27 goods and services	1.64	3.17	1.09	3.72

Source: own calculations project data and Eurostat data, see Tables 5.2 and 5.3.

Note that the column traders affected is the summation of the columns exporters and importers minus the column two-way traders.

The number of intra-EU traders in goods is accurate apart from the estimate on Belgian and Irish traders. Portugal forms only a small part of the EU economy and it is not clear that its structure of the economy is representative for the whole EU. In more services oriented economies (like the UK, Denmark, and Sweden) the number of firms trading in services could be much higher. It could be much lower for more manufacturing oriented economies (like Germany, Poland, Czech Republic and Hungary). In the former case a 40 percent increase in the number of intra-EU traders could be reasonable and the latter case a 20 percent increase. Then the bandwidth for the number of intra-EU services traders is 0.53 to 1.06 million firms. This suggests that we cannot estimate the number of intra-EU traders in services very accurately. Combined with the number of traders in goods, the accuracy is much higher. The bandwidth varies from 3.2 to 3.7 million firms and of exporters 1.4 to 1.6 million firms.

Recently PWC (2013) published a report on the feasibility and impact of a common standard VAT return. In that report PWC estimates 35.7 million VAT-registered tax payers in the EU. 29.8 million of them periodically file VAT returns. These numbers are delivered by tax authorities and fiscal

⁴² Data source: Eurostat.

attachés to PWC. These 35.7 million tax payers are mainly firms including the self employed which have to levy VAT. Moreover 3.8 million of these VAT payers are firms registered in two or more member states because of the VAT. If we would consider these different VAT registrations of a firm as one tax payer the ultimate number of VAT- registered tax payers would be somewhat lower. The numbers exclude firms in sectors which are tax-exempt such as the financial and insurance sector. A substantial part also does business with other member states; according to our estimates 3.2 to 3.7 million firms. All these firms probably periodically file VAT returns. If we consider the 29.8 million VAT payers as active firms in the EU, 10.7 to 12.5 percent of these firms is doing business with other EU member states by exporting or importing goods or services. Only about 5 percent of the firms are intra-EU exporters. Intra-EU exporters are more heavily affected by a proposal of levying the VAT of the destination country of their exports than intra-EU importers are.

These numbers are two to three times as high as the 3.5 percent mentioned in Table 5.2. The main reasons for this difference is that the number of firms with trade values below the intrastat threshold is underestimated and that the number of French firms is very high in Table 5.2 We know this from comparing the number of intra-EU traders in Table 5.2 and those in Table 5.3 and from comparing the number of active firms in Table 5.2 with Eurostat data on the population of active enterprises. Moreover, the number of active firms in Table 5.2 is comparable to the number of firms periodically sending VAT returns to the authorities. The 16 million active firms are established in 11 countries according to Table 5.2 forming 52 percent of GDP in the EU. Extrapolating this number to all EU countries would yield at 30.4 million firms. This is also higher than the Eurostat data on the population of active enterprises in 2009. Eurostat counts 24.0 million firms, only the firms in Greece and firms in agriculture in all countries are not included.⁴³

5.7 Conclusions and further work

This section has estimated that about 3.2 to 3.7 million firms in the EU are involved in intra-EU trade that is to say these firms export goods and/or services, import goods and/or services or export and import goods or services (two-way traders). This estimate is based on a fairly accurate number of intra-EU traders in goods of nearly 2.7 million traders. We have accurate data on the number of exporters and importers in all EU countries, except Belgium and Ireland. Using additional detailed data of eleven member states we were able to derive the number of two-way traders. Detailed data on services trade at the firm level are rare. Based on a detailed and integrated sample of Portuguese traders we derive that about 30 percent of the firms have to be added to the number of intra-EU traders of goods to also account for intra-EU traders in services. Allowing for some errors this implies an additional half a million to a million intra-EU traders. Clearly this number is a rough estimate and firm level data for trade in services has to be collected and made accessible. In total we estimate 3.2 to 3.7 million of intra-EU traders of goods or services. As a consequence, 10.7 to 12.5 percent of the nearly 30 million active VAT payers in the EU are intra-EU traders. By far the largest number of firms and active VAT payers will not be affected by changes in the VAT rules related to EU-trade because they do not trade and will probably not trade internationally. However for a part of these firms a revised VAT legislation regarding intra-EU trade could change their behaviour. Because it

⁴³ Note that the numbers of the project data and Eurostat data include for various countries the number of self-employed, but not for all countries.

will change the VAT compliance costs and eliminates possible risks involved with the current system they could be induced to start exporting or importing. So the number of affected firms is probably larger from a dynamic perspective than the static calculation in this report suggest. The importance and relevance of these possible changes in behaviour are hard to predict. It would also depend on the design of the VAT collection procedure, in particular whether and what kind of one stop shop mechanism would be implemented. It should be taken in mind that these behavioural responses might arise.

Exporting and importing firms will be affected differently if the VAT of the destination country is levied by the exporting firm. 1.4 to 1.6 million firms are exporting firms which would have to levy the VAT of the destination countries. This is about 5 percent of the active VAT payers in the EU. The other 1.8 to 2.1 million intra-EU traders are only importing goods or services from other EU countries.

Most of the trading firms are small with up to 49 employees or very small (micro) with up to 9 employees. Their contribution to total trade is limited however. Their average export or import value is only 10 to 20 percent of the average export or import value. The large firms with more than 250 employees are responsible for the larger share of trade. Detailed data on the export distribution shows that 80 to 90 percent of firms export less than the average exporting firm. A similar result holds for imports

For most firms the imports and exports account for only a small part of their turnover. This is the case mainly for the very small and small firms. From the economic literature we know that these firms often export to only one or two foreign markets and often export only one or two products. For those firms the administrative burden of VAT levied by the exporting firm will be limited in terms of total costs. For large firms this is different. They often trade with many countries and many products. For the larger firms changes in the VAT legislation with respect to intra-EU trade will have much larger effects than for small firms at least in absolute terms. Economic literature suggests that relative to trade volume, VAT compliance costs tend to be regressive. Thus, from such a relative perspective, an eventual impact on compliance costs is likely to affect small firms more significantly than large firms.

The objective of this paper was to estimate the number of firms that would be affected and the size of the VAT payments flows between countries. Follow up work in this direction should concentrate on the number of service traders. Because in many services sectors the VAT of the destination country is already levied future work should not only concentrate on the number of intra-EU services traders, but also the relevant sectors where VAT levied by the service exporter would make a difference. Second, this paper did not make an attempt to estimate the burden for exporting and importing firms. The paper shows that irrespective of the size of the costs firms are very differently affected. This section concentrated on the various sectors and the size of firms. Although the employment size of firms is often closely related to the number of exported or imported products or services and the trading partners, future work could investigate the differences between firms regarding the number of trading partners and goods and services in more detail.

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Annex 1: Country codes
Table A1.1 Data sources for country specific VAT rates and exemption rules

Country Code	Country Name	Country Code	Country Name
AT	Austria	LV	Latvia
BE	Belgium	LT	Lithuania
BG	Bulgaria	LU	Luxembourg
CY	Cyprus	MT	Malta
CZ	Czech Republic	NL	Netherlands
DK	Denmark	PL	Poland
EE	Estonia	PT	Portugal
FI	Finland	RO	Romania
FR	France	SK	Slovak Republic
DE	Germany	SI	Slovenia
EL	Greece	ES	Spain
HU	Hungary	SE	Sweden
IE	Ireland	UK	United Kingdom
IT	Italy		

Annex 2: HS2 Classification

Table A2.1 HS2 Classification and indication of potential overestimation using export data

HS2	Category name	B2C long-distance?	Share in total trade
01	Live animals		0.27%
02	Meat and edible meat offal		1.18%
03	Fish and crustaceans, molluscs and other aquatic invertebrates		0.51%
04	Dairy produce; birds eggs; natural honey; edible products of animal origin, not elsewhere specified or included		1.09%
05	Products of animal origin, not elsewhere specified or included		0.06%
06	Live trees and other plants; bulbs, roots and the like; cut flowers and ornamental foliage		0.35%
07	Edible vegetables and certain roots and tubers		0.56%
08	Edible fruit and nuts; peel of citrus fruits or melons		0.65%
09	Coffee, tea, maté and spices	probably	0.22%
10	Cereals		0.49%
11	Products of the milling industry; malt; starches; inulin; wheat gluten		0.12%
12	Oil seeds and oleaginous fruits; miscellaneous grains, seeds and fruit; industrial or medicinal plants; straw and fodder		0.31%
13	Lac; gums, resins and other vegetable saps and extracts		0.03%
14	Vegetable plaiting materials; vegetable products not elsewhere specified or included		0.00%
15	Animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal or vegetable waxes		0.55%
16	Preparations of meat, of fish or of crustaceans, molluscs or other aquatic invertebrates		0.38%
17	Sugars and sugar confectionery		0.29%
18	Cocoa and cocoa preparations		0.43%
19	Preparations of cereals, flour, starch or milk; pastrycooks products		0.62%
20	Preparations of vegetables, fruit, nuts or other parts of plants		0.57%
21	Miscellaneous edible preparations		0.53%
22	Beverages, spirits and vinegar		0.99%
23	Residues and waste from the food industries; prepared animal fodder		0.49%
24	Tobacco and manufactured tobacco substitutes		0.39%
25	Salt; sulphur; earths and stone; plastering materials, lime and cement		0.26%
26	Ores, slag and ash		0.34%
27	Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes		7.12%
28	Inorganic chemicals; organic or inorganic compounds of precious metals, of rare-earth metals, of radioactive elements or of isotopes		0.66%
29	Organic chemicals		2.95%
30	Pharmaceutical products	probably	4.69%

31	Fertilisers		0.29%
32	Tanning or dyeing extracts; tannins and their derivatives; dyes, pigments and other colouring matter; paints and varnishes; putty and other mastics; inks		0.71%
33	Essential oils and resinoids; perfumery, cosmetic or toilet preparations		0.91%
34	Soap, organic surface-active agents, washing preparations, lubricating preparations, artificial waxes, prepared waxes, polishing or scouring preparations, candles and similar articles, modelling pastes, dental waxes and dental preparations with a b		0.56%
35	Albuminoidal substances; modified starches; glues; enzymes		0.21%
36	Explosives; pyrotechnic products; matches; pyrophoric alloys; certain combustible preparations		0.02%
37	Photographic or cinematographic goods		0.12%
38	Miscellaneous chemical products		1.48%
39	Plastics and articles thereof		4.83%
40	Rubber and articles thereof		1.56%
41	Raw hides and skins (other than furskins) and leather		0.19%
42	Articles of leather; saddlery and harness; travel goods, handbags and similar containers; articles of animal gut (other than silkworm gut)		0.32%
43	Furskins and artificial fur; manufactures thereof		0.04%
44	Wood and articles of wood; wood charcoal		0.99%
45	Cork and articles of cork		0.03%
46	Manufactures of straw, of esparto or of other plaiting materials; basketware and wickerwork		0.01%
47	Pulp of wood or of other fibrous cellulosic material; recovered (waste and scrap) paper or paperboard		0.32%
48	Paper and paperboard; articles of paper pulp, of paper or of paperboard		2.03%
49	Printed books, newspapers, pictures and other products of the printing industry; manuscripts, typescripts and plans	probably	0.43%
50	Silk		0.01%
51	Wool, fine or coarse animal hair; horsehair yarn and woven fabric		0.10%
52	Cotton		0.13%
53	Other vegetable textile fibres; paper yarn and woven fabrics of paper yarn		0.02%
54	Strip and the like of man-made textile materials		0.21%
55	Man-made staple fibres		0.17%
56	Wadding, felt and nonwovens; special yarns; twine, cordage, ropes and cables and articles thereof		0.20%
57	Carpets and other textile floor coverings		0.13%
58	Special woven fabrics; tufted textile fabrics; lace; tapestries; trimmings; embroidery		0.06%
59	Impregnated, coated, covered or laminated textile fabrics; textile articles of a kind suitable for industrial use		0.16%
60	Knitted or crocheted fabrics		0.08%
61	Articles of apparel and clothing accessories, knitted or crocheted		1.07%

62	Articles of apparel and clothing accessories, not knitted or crocheted		1.19%
63	Other made-up textile articles; sets; worn clothing and worn textile articles; rags		0.25%
64	Footwear, gaiters and the like; parts of such articles		0.85%
65	Headgear and parts thereof		0.05%
66	Umbrellas, sun umbrellas, walking-sticks, seat-sticks, whips, riding-crops and parts thereof		0.01%
67	Prepared feathers and down and articles made of feathers or of down; artificial flowers; articles of human hair		0.01%
68	Articles of stone, plaster, cement, asbestos, mica or similar materials		0.36%
69	Ceramic products		0.31%
70	Glass and glassware		0.59%
71	Natural or cultured pearls, precious or semi-precious stones, precious metals, metals clad with precious metal, and articles thereof; imitation jewellery; coin		1.18%
72	Iron and steel		3.75%
73	Articles of iron or steel		2.40%
74	Copper and articles thereof		1.13%
75	Nickel and articles thereof		0.10%
76	Aluminium and articles thereof		1.49%
78	Lead and articles thereof		0.06%
79	Zinc and articles thereof		0.14%
80	Tin and articles thereof		0.04%
81	Other base metals; cermets; articles thereof		0.10%
82	Tools, implements, cutlery, spoons and forks, of base metal; parts thereof of base metal		0.43%
83	Miscellaneous articles of base metal		0.52%
84	Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof		12.13%
85	Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers, and parts and accessories of such articles	probably	9.85%
86	Railway or tramway locomotives, rolling-stock and parts thereof; railway or tramway track fixtures and fittings and parts thereof; mechanical (including electro-mechanical) traffic signalling equipment of all kinds		0.21%
87	Vehicles other than railway or tramway rolling-stock, and parts and accessories thereof		11.22%
88	Aircraft, spacecraft, and parts thereof		1.40%
89	Ships, boats and floating structures		0.22%
90	Optical, photographic, cinematographic, measuring, checking, precision, medical or surgical instruments and apparatus; parts and accessories thereof		2.63%
91	Clocks and watches and parts thereof	probably	0.09%
92	Musical instruments; parts and accessories of such articles	probably	0.03%
93	Arms and ammunition; parts and accessories thereof		0.04%

94	Furniture; bedding, mattresses, mattress supports, cushions and similar stuffed furnishings; lamps and lighting fittings, not elsewhere specified or included; illuminated signs, illuminated name-plates and the like; prefabricated buildings		1.60%
95	Toys, games and sports requisites; parts and accessories thereof	probably	0.62%
96	Miscellaneous manufactured articles		0.17%
97	Works of art, collectors pieces and antiques	yes	0.02%
99	Other products		0.29%

Source: EUROSTAT, ComExt and own calculations. Note: "Share in total trade" is measured as average EU27 share in total goods trade using export data for 2011. The column "B2C long distance?" indicates which categories are most likely to contain a significant share of B2C distant selling trade (when using export data).

Table A2.3 Extract of selected HS2 categories and corresponding effective VAT tax rates per importing country 2011, export data

		COUNTRY CODES													
		AT	BE	BG	CY	CZ	DK	EE	FI	FR	DE	EL	HU	IE	IT
CATEGORIES (HS2)	02	10.00%	6.00%	20.00%	5.00%	5.00%	25.00%	25.00%	14.00%	5.50%	7.00%	13.00%	27.00%	0.00%	10.00%
	07	10.01%	6.00%	20.00%	5.00%	5.00%	25.00%	25.00%	14.00%	5.50%	7.60%	13.00%	27.00%	21.88%	4.00%
	08	10.00%	6.00%	20.00%	5.00%	5.00%	25.00%	25.00%	14.00%	5.50%	7.37%	13.00%	27.00%	23.00%	4.00%
	20	14.14%	6.00%	20.00%	5.00%	5.00%	25.00%	25.00%	14.00%	5.50%	11.81%	13.00%	27.00%	23.00%	21.00%
	22	19.74%	20.94%	20.00%	17.84%	17.84%	25.00%	25.00%	22.14%	16.36%	18.87%	21.04%	27.00%	23.00%	15.33%
	26	20.00%	21.00%	20.00%	18.00%	18.00%	25.00%	25.00%	24.00%	19.60%	19.00%	23.00%	27.00%	23.00%	21.00%
	27	20.00%	21.00%	20.00%	18.00%	18.00%	25.00%	25.00%	24.00%	19.60%	19.00%	23.00%	27.00%	23.00%	21.00%
	29	19.99%	20.69%	20.00%	15.16%	15.16%	25.00%	25.00%	23.50%	16.85%	18.88%	21.07%	25.88%	23.00%	19.57%
	30	20.00%	8.84%	20.00%	5.00%	5.00%	25.00%	25.00%	10.00%	5.53%	18.80%	6.52%	5.67%	23.00%	11.86%
	39	20.00%	21.00%	20.00%	18.00%	18.00%	25.00%	25.00%	24.00%	19.60%	19.00%	23.00%	27.00%	23.00%	21.00%
	44	18.99%	21.00%	20.00%	18.00%	18.00%	25.00%	25.00%	24.00%	19.60%	18.64%	23.00%	27.00%	23.00%	21.00%
	48	20.00%	19.09%	20.00%	18.00%	18.00%	25.00%	25.00%	24.00%	19.52%	19.00%	23.00%	27.00%	23.00%	21.00%
	61	20.00%	21.00%	20.00%	18.00%	18.00%	25.00%	25.00%	24.00%	19.60%	19.00%	23.00%	27.00%	23.00%	21.00%
	71	20.00%	21.00%	20.00%	18.00%	18.00%	25.00%	25.00%	24.00%	19.60%	17.69%	23.00%	27.00%	23.00%	21.00%
	72	20.00%	21.00%	20.00%	18.00%	18.00%	25.00%	25.00%	24.00%	19.60%	19.00%	23.00%	27.00%	23.00%	21.00%
	73	20.00%	21.00%	20.00%	18.00%	18.00%	25.00%	25.00%	24.00%	19.60%	19.00%	23.00%	27.00%	23.00%	21.00%
	85	20.00%	21.00%	20.00%	18.00%	18.00%	25.00%	25.00%	24.00%	19.60%	19.00%	23.00%	27.00%	23.00%	21.00%
	87	20.00%	21.00%	20.00%	18.00%	18.00%	25.00%	25.00%	24.00%	19.60%	19.00%	23.00%	27.00%	23.00%	18.96%
	90	20.00%	11.69%	20.00%	10.74%	10.74%	25.00%	25.00%	24.00%	13.82%	17.83%	16.86%	21.80%	23.00%	12.56%
	94	20.00%	21.00%	20.00%	17.94%	17.94%	25.00%	25.00%	24.00%	19.60%	19.00%	23.00%	27.00%	23.00%	21.00%

Source: EUROSTAT and own calculations based on various VAT rate data sources, see Table A5.1.

		COUNTRY CODES												
		LV	LT	LU	MT	NL	PL	PT	RO	SK	SI	ES	SE	UK
CATEGORIES(HS2)	02	21.00%	21.00%	3.00%	0.00%	6.00%	5.00%	6.00%	24.00%	20.00%	8.50%	10.00%	12.00%	0.00%
	07	21.00%	21.00%	3.00%	0.00%	6.00%	5.47%	19.61%	24.00%	20.00%	8.50%	4.00%	12.00%	0.00%
	08	21.00%	21.00%	3.00%	0.00%	6.00%	7.59%	6.00%	24.00%	20.00%	8.50%	4.00%	12.00%	0.85%
	20	21.00%	21.00%	3.00%	0.59%	6.00%	8.00%	6.39%	24.00%	20.00%	8.50%	4.00%	25.00%	6.32%
	22	21.00%	21.00%	9.59%	15.39%	17.94%	22.95%	17.47%	24.00%	20.00%	14.81%	20.93%	23.05%	20.00%
	26	21.00%	21.00%	15.00%	18.00%	21.00%	23.00%	23.00%	24.00%	20.00%	20.00%	21.00%	25.00%	20.00%
	27	21.00%	21.00%	14.91%	18.00%	21.00%	23.00%	23.00%	24.00%	20.00%	20.00%	21.00%	25.00%	20.00%
	29	19.77%	20.86%	14.56%	18.00%	20.09%	22.08%	21.32%	23.02%	19.61%	18.95%	19.75%	24.38%	20.00%
	30	13.61%	6.35%	3.00%	0.35%	8.78%	8.00%	8.44%	9.00%	11.16%	8.50%	7.57%	25.00%	20.00%
	39	21.00%	21.00%	15.00%	18.00%	21.00%	23.00%	23.00%	24.00%	20.00%	20.00%	21.00%	25.00%	20.00%
	44	21.00%	21.00%	15.00%	18.00%	21.00%	23.00%	23.00%	24.00%	20.00%	20.00%	21.00%	25.00%	20.00%
	48	20.97%	21.00%	15.00%	18.00%	20.85%	23.00%	22.90%	24.00%	19.96%	20.00%	20.95%	25.00%	20.00%
	61	21.00%	21.00%	15.00%	18.00%	21.00%	23.00%	23.00%	24.00%	20.00%	20.00%	21.00%	25.00%	19.79%
	71	21.00%	21.00%	15.00%	18.00%	21.00%	23.00%	23.00%	24.00%	20.00%	20.00%	21.00%	25.00%	20.00%
	72	21.00%	21.00%	15.00%	18.00%	21.00%	23.00%	23.00%	24.00%	20.00%	20.00%	21.00%	25.00%	20.00%
	73	21.00%	21.00%	15.00%	18.00%	21.00%	23.00%	23.00%	24.00%	20.00%	20.00%	21.00%	25.00%	19.43%
	85	21.00%	21.00%	15.00%	18.00%	21.00%	23.00%	23.00%	24.00%	20.00%	20.00%	21.00%	25.00%	19.59%
	87	21.00%	21.00%	15.00%	18.00%	21.00%	23.00%	23.00%	24.00%	20.00%	20.00%	21.00%	25.00%	19.97%
	90	16.93%	13.59%	9.62%	14.92%	14.73%	17.92%	14.31%	20.09%	17.47%	15.70%	15.57%	25.00%	20.00%
	94	21.00%	21.00%	15.00%	18.00%	21.00%	23.00%	23.00%	24.00%	20.00%	20.00%	21.00%	25.00%	20.00%

Annex 3: Balance of Payments - Services Classification

The following table lists all subcategories (according to the fifth edition of the BoP Manual, BMP5) without intermediate aggregation categories. This means that summing over data of the listed positions avoids double-counting⁴⁴ and results in data for aggregate services. The fourth column indicates whether a position was included according to the task of identifying reverse charged transactions and excluding categories which predominantly capture B2C services trade. On top, single positions can still be exempted from VAT by individual countries which was taken into account but not reported in the following list. The last two columns give the share of the corresponding position in total services trade (using export as well as import data). These figures are reported for 2011 for the EU27 in aggregate using the data sources and imputation methods described in this report.

Table A3.1 Balance of payments service categories included in the analysis and their EU27 average share in total services trade

BoP Code	Structure	Service name	Included	Share in total trade in %	
				export	import
201	1.1	Branding, Quasi-transit adjustment	Yes	0.0	0.0
207	1.2.1.1	Passenger transport on sea Passenger transport is taxed according to the distances covered (i.e. also for the distance travelled in countries of transit), see Article 48. Given that the tax base in the receiving country is often only a share of the recorded transaction and that a significant amount can be expected to be B2C we excluded all passenger transport services.	No	0.3	0.2
208	1.2.1.2	Sea transport, Freight transport on sea	Yes	4.4	3.4
209	1.2.1.3	Supporting, auxiliary and other sea transport services	Yes	1.0	2.2
211	1.2.2.1	Passenger transport by air See 207	No	3.1	3.4
212	1.2.2.2	Freight transport by air	Yes	0.4	0.7
213	1.2.2.3	Supporting, auxiliary and other air transport services	Yes	1.7	1.4
218	1.2.3.1	Space transport	Yes	0.1	0.0
220	1.2.3.2.1	Passenger on rail See 207	No	0.1	0.2
221	1.2.3.2.2	Freight on rail	Yes	0.4	0.5
222	1.2.3.2.3	Supporting, auxiliary and other rail transport services	Yes	0.1	0.1
224	1.2.3.3.1	Passenger on road See 207	No	0.0	0.0
225	1.2.3.3.2	Freight on road	Yes	4.8	6.3
226	1.2.3.3.3	Supporting, auxiliary and other road transport services	Yes	0.9	0.8
228	1.2.3.4.1	Passenger on inland waterway See 207	No	0.0	0.0
229	1.2.3.4.2	Freight on inland waterway	Yes	0.2	0.2
230	1.2.3.4.3	Supporting, auxiliary and other inland waterway transport services	Yes	0.0	0.0
231	1.2.3.5	Pipeline transport Excludes the transported freight	Yes	0.5	0.5

⁴⁴ Positions 215, 216 and 217 on transportation have been replaced by their extended versions found in positions 218 to 232.

232	1.2.3.6	Other supporting and auxiliary transport services	Yes	0.7	0.9
238	1.3.1.1	Business travel, Expenditure by seasonal and border workers Travel excludes passenger transport and covers goods and services consumed by travellers (i.e. <12 months abroad). This importantly includes hotel and restaurant services. Both are not reverse charged, but charged where the supply is physically carried out (Article 46 and 55), hence we excluded all related categories.	No	1.9	0.6
239	1.3.1.2	Business travel, Other business travel See 239	No	3.7	4.0
241	1.3.2.1	Personal travel, Health-related expenditure Not B2B, see also 239	No	2.6	0.3
242	1.3.2.2	Personal travel, Education related expenditure Not B2B, see also 239	No	2.9	0.7
243	1.3.2.3	Personal travel, Other personal travel Not B2B, see also 239	No	13.3	18.6
958	1.4.1.1.1	Postal services Postal services are not excluded in general but virtually exempted from VAT in all countries.	Yes	0.3	0.3
959	1.4.1.1.2	Courier services	Yes	0.3	0.3
247	1.4.1.2	Telecommunication services	Yes	2.3	2.8
250	1.4.2.1	Construction abroad comprises construction services by a supplying enterprise in a country other than the country of its establishment (=reporting country) (export). VAT is charged at the place of the immovable property (Article 47). Import records goods and services purchased by these enterprises in the host country which is excluded to avoid double counting.	Yes (export) No (import)	1.8	1.3
251	1.4.2.2	Construction in the compiling economy comprises construction services to residents in the reporting country supplied by enterprises with establishment in a country other than the reporting country (import). VAT is charged at the place of the immovable property (Article 47). Export records goods and services purchased by these enterprises in the reporting country which is excluded to avoid double counting.	No (export) Yes (import)	0.2	1.0
254	1.4.3.1	Life insurance and pension funding are excluded in general, see Article 135.	No	0.6	0.3
255	1.4.3.2	Freight insurance is excluded in general, see Article 135.	No	0.1	0.2
256	1.4.3.3	Other direct insurance is excluded in general, see Article 135.	No	0.9	0.5
257	1.4.3.4	Reinsurance is excluded in general, see Article 135.	No	1.0	1.2
258	1.4.3.5	Insurance services, Auxiliary services are excluded in general, see Article 135.	No	0.2	0.2
260	1.4.4	Financial services are excluded in general, see Article 135.	No	7.2	4.4
263	1.4.5.1	Computer services	Yes	7.4	4.4
889	1.4.5.2.1	News agency services	Yes	0.0	0.1

890	1.4.5.2.2	Other information provision services	Yes	0.3	0.1
891	1.4.6.1	Franchises and similar rights	Yes	2.6	1.2
892	1.4.6.2	Other royalties and license fees	Yes	2.4	5.4
270	1.4.7.1.1	Merchandising captures the difference between the value of acquired and resold goods and therefore includes commodity arbitrage and wholesale trading. Typical services as storing, displaying and minimal processing of goods are not included in the data. As price differences in goods trade are already captured using goods trade data this item was excluded.	No	5.8	0.0
271	1.4.7.1.2	Other trade-related services covers commissions on goods and service transactions.	Yes	2.4	4.4
272	1.4.7.2	Operational leasing services	Yes	1.2	1.6
275	1.4.7.3.1.1	Legal services	Yes	0.6	0.3
276	1.4.7.3.1.2	Accounting, auditing, book-keeping and tax consulting services	Yes	0.8	0.5
277	1.4.7.3.1.3	Business and management consultancy, public relations services	Yes	2.4	3.8
278	1.4.7.3.2	Advertising, market research and public opinion polling	Yes	1.8	2.6
279	1.4.7.3.3	Research and development services	Yes	2.2	2.8
280	1.4.7.3.4	Architectural, engineering and other technical consultancy	Yes	2.0	3.0
282	1.4.7.3.5.1	Agricultural, mining , and on-site processing, waste treatment and depollution	Yes	0.1	0.1
283	1.4.7.3.5.2	Other agricultural, mining and on-site processing	Yes	0.3	0.3
284	1.4.7.3.6	Other miscellaneous business, professional and technical services	Yes	3.0	3.7
285	1.4.7.3.7	Services between affiliated enterprises, n.i.e.	Yes	5.1	5.7
288	1.4.8.1	Audio-visual and related services	Yes	0.6	0.8
895	1.4.8.2.1	Education services include B2C as well as B2B transactions. The place of taxation is where the service is carried out (Article 53). Therefore, only B2B educational services consumed in the importing country (e.g. telephone or internet courses or physical presence of a lector or teacher) can be subject to reverse charge which is presumably a small share of total educational services trade.	No	0.1	0.1
896	1.4.8.2.2	Health services exclude expenditure of travellers (<12 months abroad). The remaining part is therefore comprised by a signification share of B2B services, like laboratory and similar services.	Yes	0.1	0.1
897	1.4.8.2.3	Other personal, cultural and recreational services, Other mainly comprise B2C transactions.	No	0.3	0.2
292	1.4.9.1	Embassies and consulates Government services have been excluded.	No	0.1	0.1
293	1.4.9.2	Military units and agencies See 292.	No	0.1	0.3
294	1.4.9.3	Other government services See 292.	No	0.1	0.3

982	1.5	Services not allocated Due to lack of information this category was excluded.	No	0.1	0.2
894	1.6	Audiovisual transactions	Yes	0.0	0.2

Source: EUROSTAT, balance of payments and own calculations and United Nations (2002).

Annex 4: Technical notes on working with BoP service data

As mentioned before the quality of the data on trade in services is considerably worse than for goods trade. A specific problem is that of missing observations (NAs) due to reasons of confidentiality or without a particular explanation provided. Missing values often do not occur at the aggregate but at higher precision levels.⁴⁵ However, data on a detailed disaggregated level is important because VAT rates can often only be assigned meaningfully to more disaggregated service groups.

A typical problem is how to allocate available data to lower subcategories for which data is (partially) missing. We addressed this challenge using specific rules of data imputation which are described below. Before that we want to explain the potential bias compared to a fictitious scenario in which there are no missing data points. Given that results on VAT payments are presented at an aggregate level a bias does not occur if categories with missing observations would be taxed at the same rate or are all exempted anyways. The data imputation procedure is based on the explicit agreement with the European Commission not to mix import (debit) and export (credit) data and to carry out the analysis separately for both data sources.

Three guiding principles⁴⁶ were chosen for computing the allocation weights: (1) Use existing information of the same country, (2) if unavailable, use average EU-27 data of countries that do report values for the affected categories (“global weights”), (3) if unavailable, assign equal weights.

The data is characterized by a tree structure consisting of nodes. The imputation procedure was carried out for every reporting-country-partner-country pair at every single node (if necessary) in a recursive way, i.e. starting at the least detailed category first. The computation of “global weights” works as follows. At every node in the BoP service data structure we excluded all countries with at least one missing value focusing on trade with the other 26 EU countries. The average split of the data at a node over its subcomponents was taken as “global weights”. The average was computed over the non-excluded countries weighted according to their total absolute services trade versus the other 26 EU countries. The following problems illustrate the chosen method.

Missing aggregate data:

In rare cases aggregate total trade services (1) are completely missing which apparently happens if for an important subcategory no value is reported although it presumably is non-zero. In this case we nevertheless set the not available value to zero and compute the aggregate from the reported data (Example 1). This leads to a lower underestimation than excluding the whole reporting-country-partner-country pair. A similar procedure is carried out if the total aggregate is missing as well as the value for an immediate subcategory although (at least some) values are reported at a more detailed level (Example 2).

⁴⁵ In addition some countries report negative values in some rare cases. Those values are always very small in magnitude. Due to the lack of a meaningful interpretation we treated those values like NA entries.

⁴⁶ Taken information from different years was not an option because NA entries typically appear systematically for the same categories irrespective of the reporting year.

Missing aggregate data – Example 1

Raw data	
Tree structure	Data value
1	NA
1.1	1 000
...	
1.2	300
...	
1.3	NA
...	...
1.4	4 000

Adjusted data	
Tree structure	Data value
1	5 300
1.1	1 000
...	...
1.2	300
...	...
1.3	0
...	...
1.4	4 000

Missing aggregate data – Example 2

Raw data	
Tree structure	Data value
1	NA
1.1	NA
1.1.1	300
1.1.2	NA
...	
1.2	NA
...	...
1.3	4 000

Adjusted data	
Tree structure	Data value
1	4 300
1.1	300
1.1.1	300
1.1.2	0
...	
1.2	0
...	...
1.3	4 000

Inconsistent data:

In some cases the reported data is not consistent, i.e. data at a node X and its subcomponents is fully reported but the subcategories do not sum to the aggregate number. In this case data in the subcategories was adjusted proportionally (Example 1) or in equal parts (Example 2) if all subcategories were reported to be zero. This rare event is the only case in which reported data is altered. Inconsistencies of that sort are typically small and might stem from rounding errors.

Inconsistent data – Example 1

Raw data	
Tree structure	Data value
...	...
X	101
X.1	80
X.2	20
Y	...
...	...

Adjusted data	
Tree structure	Data value
...	...
X	101
X.1	80.8
X.2	20.2
Y	...
...	...

Inconsistent data – Example 2

Raw data	
Tree structure	Data value
...	...
X	1
X.1	0
X.2	0
Y	...
...	...

Adjusted data	
Tree structure	Data value
...	...
X	1
X.1	0.5
X.2	0.5
Y	...
...	...

Single missing data point per node:

If some node X has subcategories of which only one has a missing value it is filled with the residual in order to make the information at node X consistent.

Single missing data point - Example

Raw data	
Tree structure	Data value
...	...
X	50
X.1	NA
X.2	45
Y	...
...	...

Adjusted data	
Tree structure	Data value
...	...
X	50
X.1	5
X.2	45
Y	...
...	...

Multiple missing data points per node:

If multiple data points are missing at a node we used information from other EU countries (“global weights”), see Example 1. In case also those global weights were zero, which can happen if no trade in this category is recorded for any EU-27 country, we used an equal split (Example 2).

Multiple missing data points – Example 1

Assume the global weights for X.1, X.2 and X.3 are 0.3, 0.2 and 0.5.

Raw data		Adjusted data	
Tree structure	Data value	Tree structure	Data value
...
X	30	X	30
X.1	NA	X.1	12
X.2	NA	X.2	8
X.3	10	X.3	10
Y	...	Y	...
...

Multiple missing data points – Example 2

Global weights for X.1 and X.2 are both 0.

Raw data		Adjusted data	
Tree structure	Data value	Tree structure	Data value
...
X	3	X	3
X.1	NA	X.1	1.5
X.2	NA	X.2	1.5
Y	...	Y	...
...

Annex 5: Data sources for country specific VAT legislation

Table A5.1 Data sources for country specific VAT rates and exemption rules

Country	Source
AT	“Umsatzsteuergesetz”, legislative text
BE	CASE, “Study on the economic effects of the current VAT rates structure” ⁴⁷
BG	CASE, “Study on the economic effects of the current VAT rates structure”, Value added tax act, English translation of legislative text
CY	CASE, “Study on the economic effects of the current VAT rates structure”
CZ	CASE, “Study on the economic effects of the current VAT rates structure”
DK	CASE, “Study on the economic effects of the current VAT rates structure”
EE	CASE, “Study on the economic effects of the current VAT rates structure”, Value added tax act, English translation of legislative text
FI	CASE, “Study on the economic effects of the current VAT rates structure”
FR	CASE, “Study on the economic effects of the current VAT rates structure”
DE	“Umsatzsteuergesetz”, legislative text
EL	CASE, “Study on the economic effects of the current VAT rates structure”
HU	CASE, “Study on the economic effects of the current VAT rates structure”
IE	Value-Added Tax Consolidation Act 2010 and amendments
IT	CASE, “Study on the economic effects of the current VAT rates structure”
LV	CASE, “Study on the economic effects of the current VAT rates structure”
LT	CASE, “Study on the economic effects of the current VAT rates structure”
LU	CASE, “Study on the economic effects of the current VAT rates structure”, KPMG (2012)
MT	CASE, “Study on the economic effects of the current VAT rates structure”, Value added tax act, legislative text
NL	CASE, “Study on the economic effects of the current VAT rates structure”
PL	CASE, “Study on the economic effects of the current VAT rates structure”
PT	CASE, “Study on the economic effects of the current VAT rates structure”
RO	CASE, “Study on the economic effects of the current VAT rates structure”
SK	CASE, “Study on the economic effects of the current VAT rates structure”
SI	CASE, “Study on the economic effects of the current VAT rates structure”, Value added tax act, unofficial English translation of the legislative text
ES	CASE, “Study on the economic effects of the current VAT rates structure”
SE	CASE, “Study on the economic effects of the current VAT rates structure”
UK	HM Revenue & Customs, online information

⁴⁷ Sources for the mentioned study are various publications by the European Commission, DG Taxud and IBFD.

Annex 6: NACE classification

A	agriculture, forestry and fishing
B	mining and quarrying
C	manufacturing
D	electricity, gas, steam and air conditioning supply
E	water supply; sewerage, waste management and remediation activities
F	construction
G	wholesale and retail trade; repair of motor vehicles and motorcycles
H	transportation and storage
I	accommodation and food service activities
J	information and communication
K	financial and insurance activities
L	real estate activities
M	professional, scientific and technical activities
N	administrative and support service activities
O	public administration and defense; compulsory social security
P	education
Q	human health and social work activities
R	arts, entertainment and recreation
S	other service activities
T	activities of households as employers; undifferentiated goods- and services-producing activities of households for own use
U	activities of extraterritorial organisations and bodies

Annex 7: Distribution of trading firms and trade value by firm size

Table A7.1 The distribution of intra-EU importers by firm size (2009, Eurostat)

	0-9 emp	10-49 emp	50-249 emp	250> emp	unknown
Austria	0.76	0.17	0.04	0.01	0.02
Bulgaria	0.56	0.28	0.12	0.02	0.01
Cyprus	0.69	0.13	0.03	0.01	0.14
Czech Republic	0.22	0.15	0.07	0.02	0.55
Denmark	0.76	0.15	0.04	0.01	0.03
Estonia	0.70	0.20	0.07	0.01	0.01
Finland	0.76	0.16	0.04	0.02	0.02
France	0.43	0.36	0.13	0.05	0.03
Germany	0.51	0.14	0.04	0.01	0.30
Greece	0.43	0.15	0.04	0.01	0.36
Hungary	0.70	0.21	0.06	0.02	0.01
Italy	0.68	0.20	0.04	0.01	0.06
Latvia	0.67	0.24	0.07	0.01	0.01
Lithuania	0.56	0.29	0.09		0.06
Luxembourg	0.49	0.14	0.03	0.01	0.32
Malta	0.73	0.15	0.04	0.01	0.07
Netherlands	0.77	0.17	0.04	0.01	0.01
Poland	0.58	0.24	0.12	0.03	0.03
Portugal	0.76	0.17	0.04	0.01	0.02
Romania	0.66	0.23	0.08	0.02	0.00
Slovakia	0.49	0.18	0.04	0.01	0.28
Slovenia	0.79	0.14	0.04	0.01	0.03
Spain	0.41	0.24	0.10	0.03	0.22
Sweden	0.73	0.17	0.04	0.02	0.05
United Kingdom	0.66	0.23	0.07	0.02	0.02
Total	0.61	0.19	0.06	0.01	0.13

Table A7.2 The distribution of intra-EU exporters by firm size (2009, Eurostat)

	0-9 emp	10-49 emp	50-249 emp	250> emp	unknown
Austria	0.66	0.24	0.07	0.02	0.01
Bulgaria	0.47	0.32	0.17	0.03	0.01
Cyprus	0.51	0.17	0.06	0.01	0.25
Czech Republic	0.23	0.14	0.07	0.02	0.55
Denmark	0.65	0.22	0.07	0.03	0.03
Estonia	0.66	0.24	0.08	0.01	0.01
Finland	0.60	0.25	0.09	0.04	0.01
France	0.41	0.36	0.16	0.05	0.02
Germany	0.43	0.18	0.07	0.02	0.30
Greece	0.41	0.25	0.08	0.02	0.24
Hungary	0.65	0.24	0.07	0.02	0.01
Italy	0.54	0.31	0.07	0.01	0.07
Latvia	0.58	0.30	0.09	0.02	0.01
Lithuania	0.46	0.36	0.12		0.03
Luxembourg	0.45	0.21	0.07	0.02	0.26
Malta	0.54	0.26	0.10	0.04	0.07
Netherlands	0.70	0.21	0.06	0.01	0.02
Poland	0.51	0.14	0.28	0.04	0.03
Portugal	0.61	0.28	0.07	0.01	0.02
Romania	0.52	0.29	0.15	0.04	0.00
Slovakia	0.45	0.24	0.07	0.02	0.23
Slovenia	0.61	0.20	0.07	0.02	0.10
Spain	0.34	0.34	0.16	0.04	0.12
Sweden	0.63	0.24	0.07	0.02	0.04
United Kingdom	0.66	0.23	0.07	0.02	0.01
Total	0.51	0.23	0.09	0.02	0.14

Table A7.3 The distribution of intra-EU import value by firm size (2009, Eurostat)

	0-9 emp	10-49 emp	50-249 emp	250> emp	unknown
Austria	0.20	0.19	0.23	0.36	0.02
Bulgaria	0.18	0.21	0.28	0.28	0.04
Cyprus	0.21	0.26	0.27	0.20	0.05
Czech Republic	0.06	0.13	0.21	0.38	0.21
Denmark	0.20	0.18	0.18	0.34	0.10
Estonia	0.19	0.22	0.33	0.13	0.13
Finland	0.19	0.19	0.20	0.36	0.06
France	0.18	0.17	0.16	0.48	0.01
Germany	0.09	0.13	0.15	0.42	0.20
Greece	0.14	0.22	0.27	0.26	0.12
Hungary	0.10	0.13	0.20	0.44	0.13
Italy	0.08	0.18	0.27	0.41	0.06
Latvia	0.17	0.29	0.29	0.16	0.09
Lithuania	0.13	0.23	0.33		0.32
Luxembourg	0.15	0.22	0.23	0.29	0.12
Malta	0.27	0.21	0.15	0.33	0.04
Netherlands	0.14	0.15	0.25	0.26	0.20
Poland	0.08	0.15	0.22	0.44	0.10
Portugal	0.12	0.24	0.30	0.26	0.08
Romania	0.18	0.17	0.26	0.38	0.00
Slovakia	0.14	0.17	0.16	0.40	0.12
Slovenia	0.16	0.19	0.26	0.35	0.04
Spain	0.12	0.14	0.21	0.44	0.09
Sweden	0.11	0.16	0.21	0.38	0.14
United Kingdom	0.23	0.15	0.17	0.41	0.04
Total	0.13	0.16	0.20	0.40	0.11

Table A7.4 The distribution of intra-EU export value by firm size (2009, Eurostat)

	0-9 emp	10-49 emp	50-249 emp	250> emp	unknown
Austria	0.15	0.11	0.22	0.48	0.05
Bulgaria	0.10	0.15	0.25	0.48	0.02
Cyprus	0.20	0.25	0.28	0.10	0.18
Czech Republic	0.03	0.06	0.16	0.47	0.28
Denmark	0.17	0.12	0.15	0.48	0.08
Estonia	0.12	0.22	0.33	0.19	0.14
Finland	0.07	0.06	0.14	0.70	0.03
France	0.18	0.13	0.15	0.53	0.01
Germany	0.07	0.10	0.14	0.50	0.19
Greece	0.11	0.18	0.24	0.32	0.16
Hungary	0.05	0.07	0.15	0.57	0.16
Italy	0.06	0.18	0.29	0.43	0.03
Latvia	0.13	0.25	0.39	0.20	0.04
Lithuania	0.06	0.13	0.30	0.46	0.04
Luxembourg	0.06	0.09	0.09	0.27	0.49
Malta	0.20	0.08	0.14	0.54	0.05
Netherlands	0.12	0.13	0.23	0.25	0.28
Poland	0.04	0.07	0.17	0.59	0.13
Portugal	0.08	0.14	0.29	0.41	0.08
Romania	0.16	0.09	0.22	0.54	0.00
Slovakia	0.07	0.18	0.11	0.50	0.14
Slovenia	0.08	0.08	0.19	0.43	0.21
Spain	0.12	0.13	0.23	0.47	0.06
Sweden	0.09	0.09	0.18	0.55	0.09
United Kingdom	0.27	0.10	0.18	0.38	0.08
Total	0.11	0.12	0.19	0.45	0.14

Annex 8: Country results

Table A8.1 Number of importers, exporters and two-way traders (Denmark, 2008)

Sector	Exporters	Importers	Two-way traders	Firms	Trading firms	Share trading firms
Agriculture	87	116	32		171	
Mining	17	18	11		24	
Manufacturing	1 779	2 171	1 433		2 517	
Electricity	1	10	0		11	
Water supply	16	22	7		31	
Construction	15	155	12		158	
Wholesale	2 015	5 173	1 571		5 617	
Transportation	47	83	13		117	
Hotels	2	15	1		16	
Information	48	134	32		150	
Finance	0	0	0		0	
Real estate	4	17	3		18	
Prof services	74	154	52		176	
Support services	32	80	18		94	
Government						
Education						
Social work	0	2	0		2	
Arts	1	11	0		12	
Other services	7	24	5		26	

Table A8.2 The value of imports and exports in euros and the average firm relative to turnover (Denmark, 2008)

Sector	Export value (million euro)	Import value (million euro)	Relative export value (% to turnover)	Relative import value (% to turnover)
Agriculture	286.4	114.3	0.49	0.28
Mining	4 249.9	31.7	0.48	0.09
Manufacturing	23 385.8	12 973.6	0.43	0.26
Electricity		78.3		0.03
Water supply	329.8	92.7	0.39	0.13
Construction	27.1	185.8	0.19	0.22
Wholesale	12 294.0	26 009.5	0.43	0.49
Transportation	326.1	164.6	0.14	0.17
Hotels		8.0		0.10
Information	149.3	447.6	0.30	0.17
Finance				
Real estate	4.6	42.3	0.44	2.28
Prof services	391.1	706.7	0.35	0.36
Support services	148.8	173.9	1.55	0.39
Government				
Education				
Social work				
Arts		6.3		0.10
Other services	7.7	18.6	0.36	0.23

Table A8.3 The distribution of import and export value in million euros and relative to turnover (Denmark, 2008)

	10p	20p	30p	40p	50p	60p	70p	80p	90p
Value export	0.10	0.49	0.87	1.29	1.85	2.75	4.27	7.34	15.81
Share export	0.01	0.06	0.12	0.20	0.29	0.38	0.49	0.61	0.81
Value import	0.18	0.33	0.49	0.69	0.98	1.46	2.25	3.87	9.28
Share import	0.03	0.08	0.13	0.19	0.26	0.34	0.43	0.55	0.72

Table A8.4 Number of importers, exporters and two-way traders (Estonia, 2008)

Sector	Exporters	Importers	Two-way traders	Firms	Trading firms	Share trading firms
Agriculture	32	33	16	2 012	49	2.4
Mining	0	0	0	8	0	0.0
Manufacturing	1 122	875	680	5 400	1 317	24.4
Electricity	2	11	1	148	12	8.1
Water supply	16	19	9	240	26	10.8
Construction	65	153	31	7 446	187	2.5
Wholesale	865	2 243	642	14 768	2 466	16.7
Transportation	55	121	30	4 021	146	3.6
Hotels	3	14	1	1 777	16	0.9
Information	14	45	11	2 145	48	2.2
Finance	9	16	5	973	20	2.1
Real estate	11	13	2	3 561	22	0.6
Prof services	27	51	8	6 416	70	1.1
Support services	28	61	17	3 826	72	1.9
Government	0	1	0	13	1	7.7
Education	13	18	4	3 150	27	0.9
Social work	0	8	0	1 049	8	0.8
Arts	0	9	0	814	9	1.1
Other services	20	30	14	1 349	36	2.7

Table A8.5 The value of imports and exports in euros and the average firm relative to turnover (Estonia, 2008)

Sector	Export value (million euro)	Import value (million euro)	Relative export value (% to turnover)	Relative import value (% to turnover)
Agriculture	82.6	37.4	0.47	0.17
Mining	0.0	0.0		
Manufacturing	2 978.7	1 822.7	0.49	0.31
Electricity	0.0	31.7	0.00	0.07
Water supply	215.4	74.8	0.31	0.09
Construction	58.2	120.5	0.13	0.10
Wholesale	1 276.4	4 157.6	0.20	0.36
Transportation	68.7	674.4	0.19	0.63
Hotels	3.1	13.6	0.15	0.27
Information	5.7	48.7	0.03	0.06
Finance	6.0	90.5	0.05	0.67
Real estate	12.7	3.7	0.25	0.28
Prof services	70.4	184.4	0.74	1.34
Support services	17.9	28.9	0.17	0.15
Government	0.0	0.0	0.00	0.00
Education	2.4	13.8	0.22	0.78
Social work	0.0	4.8	0.00	0.05
Arts	0.0	4.9	0.00	0.02
Other services	53.6	38.5	0.47	0.30

Table A8.6 The distribution of import and export value in million euros and relative to turnover (Estonia, 2008)

	10p	20p	30p	40p	50p	60p	70p	80p	90p
Value export	0.05	0.12	0.19	0.28	0.44	0.69	1.15	2.01	4.61
Share export	0.07	0.11	0.13	0.32	0.06	0.16	0.34	0.24	0.87
Value import	0.01	0.09	0.16	0.24	0.37	0.55	0.88	1.59	3.81
Share import	0.57	0.13	0.66	0.54	0.45	0.38	0.61	0.20	0.59

Table A8.7 Number of importers, exporters and two-way traders (Finland, 2010)

Sector	Exporters	Importers	Two-way traders	Firms	Trading firms	Share trading firms
Agriculture	22	156	12	379	166	43.8
Mining	14	15	9	51	20	39.2
Manufacturing	1 579	1 991	1 131	4 465	2 439	54.6
Electricity	8	28	7	55	29	52.7
Water supply	9	23	6	52	26	50.0
Construction	40	357	26	958	371	38.7
Wholesale	725	4 294	583	9 122	4 436	48.6
Transportation	23	121	19	666	125	18.8
Hotels	0	0	0	0	0	
Information	45	128	25	997	148	14.8
Finance	5	32	4	149	33	22.1
Real estate	0	0	0	0	0	
Prof services	76	185	32	1 564	229	14.6
Support services						
Government						
Education						
Social work						
Arts						
Other services	4	56	3	273	57	20.9

Table A8.8 The value of imports and exports in euros and the average firm relative to turnover (Finland, 2010)

Sector	Export value (million euro)	Import value (million euro)	Relative export value (% to turnover)	Relative import value (% to turnover)
Agriculture	17.0	34.5	0.05	1.06
Mining	94.1	34.4	0.11	0.04
Manufacturing	22 968.8	9 636.7	0.22	0.09
Electricity	285.6	266.7	0.25	0.06
Water supply	101.6	34.6	0.14	0.04
Construction	14.6	375.5	0.01	0.05
Wholesale	1 234.1	12 809.3	0.03	0.17
Transportation	15.0	421.0	0.01	0.06
Hotels				
Information	53.3	205.1	0.01	0.03
Finance	2.4	41.2		
Real estate				
Prof services	121.9	105.0	0.20	0.10
Support services				
Government				
Education				
Social work				
Arts				
Other services	6.9	17.6	0.05	0.06

Table A8.9 The distribution of import and export value in million euros and relative to turnover (Finland, 2010)

	10p	20p	30p	40p	50p	60p	70p	80p	90p
Value export	0.04	0.13	0.33	0.56	0.86	1.32	2.16	3.97	10.40
Share export	0.01	0.02	0.05	0.09	0.14	0.21	0.29	0.40	0.55
Value import	0.01	0.06	0.16	0.27	0.41	0.65	1.08	2.00	5.00
Share import	0.01	0.04	0.07	0.12	0.17	0.26	0.36	0.47	0.63

Table A8.10 Number of importers, exporters and two-way traders (France, 2008)

Sector	Exporters	Importers	Two-way traders	Firms	Trading firms	Share trading firms
Agriculture	240	33	22	8 527	251	2.9
Mining	152	153	81	6 775	224	3.3
Manufacturing	17 532	21 182	13 335	2 063 400	25 379	1.2
Electricity	0	54	0	5 216	54	1.0
Water supply	507	438	227	20 672	718	3.5
Construction	410	2 520	254	476 453	2 676	0.6
Wholesale	19 224	38 194	12 816	3 575 904	44 602	1.2
Transportation	375	590	137	138 846	828	0.6
Hotels	34	242	17	244 538	259	0.1
Information	1 101	1 193	477	129 025	1 817	1.4
Finance	0	28	0	42 625	28	0.1
Real estate	59	164	22	160 842	201	0.1
Prof services	962	1 641	511	410 027	2 092	0.5
Support services	489	1 076	266	175 711	1 299	0.7
Government						
Education	24	59	12	61 812	71	0.1
Social work	0	45	0	350 619	45	0.0
Arts	73	198	30	74 328	241	0.3
Other services	111	241	77	174 685	275	0.2

Table A8.11 The value of imports and exports in euros and the average firm relative to turnover (France, 2008)

Sector	Export value (million euro)	Import value (million euro)	Relative export value (% to turnover)	Relative import value (% to turnover)
Agriculture	189.2	41.0	0.21	0.25
Mining	328.2	176.3	0.09	0.03
Manufacturing	145 993.1	105 825.5	0.11	0.09
Electricity	0.0	69.3	0.00	0.00
Water supply	2 558.2	543.3	0.14	0.01
Construction	535.3	1 781.0	0.03	0.03
Wholesale	40 763.4	104 878.5	0.10	0.10
Transportation	4 622.6	1 547.8	0.02	0.01
Hotels	6.1	92.7	0.01	0.02
Information	1 008.5	2 117.6	0.02	0.01
Finance	0.0	7.7	0.00	0.01
Real estate	11.9	74.6	0.14	0.04
Prof services	1 285.5	1 518.7	0.11	0.02
Support services	820.6	1 404.1	0.05	0.04
Government				
Education	166.0	40.9	0.03	0.04
Social work	0.0	8.2	0.00	0.02
Arts	33.5	70.0	0.14	0.02
Other services	138.6	292.0	0.10	0.04

Table A8.12 The distribution of import and export value in million euros and relative to turnover (France, 2008)

	10p	20p	30p	40p	50p	60p	70p	80p	90p
Value export	0.03	0.03	0.07	0.14	0.26	0.46	0.86	1.82	5.31
Share export	0.00	0.01	0.02	0.04	0.07	0.11	0.17	0.26	0.42
Value import	0.02	0.08	0.15	0.23	0.34	0.51	0.85	1.60	4.18
Share import	0.01	0.02	0.04	0.07	0.11	0.16	0.23	0.34	0.51

Table A8.13 Number of importers, exporters and two-way traders (Ireland, 2008)

Sector	Exporters	Importers	Two-way traders	Firms	Trading firms	Share trading firms
Agriculture						
Mining	71	99	62	172	108	62.8
Manufacturing	2103	2772	1814	4446	3061	68.8
Electricity	153	196	129	397	220	55.4

Table A8.14 The value of imports and exports in euros and the average firm relative to turnover (Ireland, 2008)

Sector	Export value (million euro)	Import value (million euro)	Relative export value (% to turnover)	Relative import value (% to turnover)
Agriculture				
Mining	354.5	47.3	0.65	0.06
Manufacturing	38647.2	10508.2	0.50	0.11
Electricity	324.0	391.1	0.06	0.07

Table A8.15 The distribution of import and export value in million euros and relative to turnover (Ireland, 2008)

	10p	20p	30p	40p	50p	60p	70p	80p	90p
Value export	0.03	0.07	0.12	0.20	0.37	0.66	1.48	4.02	14.53
Share export	0.03	0.06	0.11	0.16	0.21	0.31	0.40	0.49	0.77
Value import	0.01	0.04	0.09	0.15	0.23	0.35	0.59	1.19	3.63
Share import	0.01	0.03	0.06	0.11	0.15	0.20	0.26	0.34	0.40

Table A8.16 Number of importers, exporters and two-way traders (Netherlands, 2008)

Sector	Exporters	Importers	Two-way traders	Firms	Trading firms	Share trading firms
Agriculture	1 760	1 116	738	2 138		
Mining	156	242	112	286		
Manufacturing	6 607	10 276	4 708	12 175		

Table A8.17 The value of imports and exports in euros and the average firm relative to turnover (Netherlands, 2008)

Sector	Export value (million euro)	Import value (million euro)	Relative export value (% to turnover)	Relative import value (% to turnover)
Agriculture	22 865.9	8 578.7	40.3	33.0
Mining	28 780.7	8 594.9	42.9	46.5
Manufacturing	113 081.3	88 910.2	51.7	51.0

Table A8.18 The distribution of import and export value in million euros and relative to turnover (Netherlands, 2008)

	10p	20p	30p	40p	50p	60p	70p	80p	90p
Value export	0.35	0.88	1.31	1.89	2.76	4.10	6.67	12.11	27.17
Share export									
Value import	0.23	0.48	0.72	1.03	1.50	2.25	3.59	6.35	14.45
Share import									

Table A8.19 Number of importers, exporters and two-way traders (Portugal, goods, 2009)

Sector	Exporters	Importers	Two-way traders	Firms	Trading firms	Share trading firms
Agriculture	829	1 130	433	7 803	1 526	19.6
Mining	188	74	62	760	200	26.3
Manufacturing	9 098	11 796	6 502	36 474	14 392	39.5
Electricity	11	42	9	422	44	10.4
Water supply	127	159	66	785	220	28.0
Construction	505	3 066	302	37 685	3 269	8.7
Wholesale	9 456	31 295	7 354	88 223	33 397	37.9
Transportation	111	336	52	18 060	395	2.2
Hotels	74	1 238	23	27 413	1 289	4.7
Information	353	917	211	6 484	1 059	16.3
Finance	3	5	2	2 968	6	0.2
Real estate	66	186	20	13 723	232	1.7
Prof services	381	1 427	226	28 853	1 582	5.5
Support services	176	861	112	10 119	925	9.1
Government						
Education	15	117	7	4 280	125	2.9
Social work	19	669	15	15 653	673	4.3
Arts	55	279	32	3 765	302	8.0
Other services	58	869	37	8 158	890	10.9

Table A8.20 The value of imports and exports in euros and the average firm value relative to turnover (Portugal, goods, 2009)

Sector	Export value (million euro)	Import value (million euro)	Relative export value (% to turnover)	Relative import value (% to turnover)
Agriculture	230.5	131.1	0.33	1.50
Mining	274.2	20.9	0.25	0.49
Manufacturing	17 605.2	11 227.2	0.26	0.13
Electricity	1 681.6	1 860.7	0.15	0.44
Water supply	113.2	30.4	0.24	0.09
Construction	73.7	482.7	0.12	0.10
Wholesale	4 895.3	20 521.9	0.14	0.27
Transportation	6.1	119.1	0.11	0.13
Hotels	3.0	33.7	0.17	0.04
Information	412.7	829.6	0.08	0.12
Finance	8.4	2.7	0.73	0.23
Real estate	18.5	19.7	0.51	2.76
Prof services	366.8	488.8	0.18	0.14
Support services	15.8	158.3	0.16	0.15
Government				
Education	0.2	4.9	0.04	0.13
Social work	0.7	22.9	0.03	0.04
Arts	4.6	8.0	0.18	0.34
Other services	3.5	16.3	0.09	0.07

Table A8.21 The distribution of import and export value in million euros and relative to turnover (Portugal, goods, 2009)

	10p	20p	30p	40p	50p	60p	70p	80p	90p
Value export	0.001	0.002	0.005	0.012	0.025	0.056	0.129	0.335	1.241
Share export	0.001	0.004	0.009	0.021	0.044	0.094	0.197	0.407	0.760
Value import	0.001	0.002	0.004	0.008	0.017	0.033	0.071	0.174	0.581
Share import	0.002	0.007	0.016	0.032	0.059	0.105	0.181	0.303	0.505

Table A8.22 Number of importers, exporters and two-way traders (Portugal, services, 2009)

Sector	Exporters	Importers	Two-way traders	Firms	Trading firms	Share trading firms
Agriculture	157	682	55	7 803	784	10.0
Mining	38	116	24	760	130	17.1
Manufacturing	3 523	4 571	1338	36 474	6 756	18.5
Electricity	19	92	10	422	101	23.9
Water supply	52	113	30	785	135	17.2
Construction	2 010	1 366	588	37 685	2 788	7.4
Wholesale	3 788	5 525	1 047	88 223	8 266	9.4
Transportation	3 223	2 056	1 600	18 060	3 679	20.4
Hotels	156	933	45	27 413	1 044	3.8
Information	1 076	944	466	6 484	1 554	24.0
Finance	105	128	42	2 968	191	6.4
Real estate	177	370	42	13 723	505	3.7
Prof services	2 593	1 775	726	28 853	3 642	12.6
Support services	1 064	830	358	10 119	1 536	15.2
Government						
Education	95	134	28	4 280	201	4.7
Social work	133	410	23	15 653	520	3.3
Arts	219	294	74	3 765	439	11.7
Other services	159	205	34	8 158	330	4.0

Table A8.23 The value of imports and exports in euros and the average firm value relative to turnover (Portugal, services, 2009)

Sector	Export value (million euro)	Import value (million euro)	Relative export value (% to turnover)	Relative import value (% to turnover)
Agriculture	12.2	34.4	0.29	1.96
Mining	5.8	9.7	0.10	0.02
Manufacturing	992.9	1 320.7	0.18	0.02
Electricity	28.2	25.5	0.26	0.06
Water supply	3.9	12.1	0.13	0.04
Construction	1 089.7	505.4	0.55	0.16
Wholesale	443.0	1 094.1	0.23	0.03
Transportation	3 650.5	2 043.2	0.47	0.30
Hotels	138.5	53.0	0.35	0.07
Information	605.0	689.3	0.23	0.11
Finance	40.4	19.0	0.44	0.18
Real estate	17.9	38.8	0.44	2.97
Prof services	1 100.7	911.1	0.30	0.19
Support services	518.6	281.6	0.34	2.06
Government				
Education	11.7	5.4	0.29	0.06
Social work	12.8	21.0	0.43	0.05
Arts	45.6	39.0	0.21	0.26
Other services	6.8	12.8	0.36	0.28

Table A8.24 The distribution of import and export value in million euros and relative to turnover (Portugal, services, 2009)

	10p	20p	30p	40p	50p	60p	70p	80p	90p
Value export	0.001	0.002	0.006	0.014	0.028	0.053	0.098	0.191	0.509
Share expors	0.001	0.005	0.016	0.040	0.099	0.228	0.467	0.840	1.000
Value import	0.000	0.000	0.001	0.002	0.005	0.013	0.031	0.080	0.275
Share import	0.000	0.001	0.002	0.005	0.009	0.017	0.036	0.088	0.293

Table A8.25 Number of importers, exporters and two-way traders (Slovenia, 2008)

Sector	Exporters	Importers	Two-way traders	Firms	Trading firms	Share trading firms
Agriculture	29	60	21	395	68	17.2
Mining	6	15	4	67	17	25.4
Manufacturing	1 091	1 679	920	6 190	1 850	29.9
Electricity	2	16	2	204	16	7.8
Water supply	21	34	9	259	46	17.8
Construction	24	308	18	6 770	314	4.6
Wholesale	534	3 198	385	13 286	3 347	25.2
Transportation	23	136	16	2 244	143	6.4
Hotels	4	42	1	2 273	45	2.0
Information	46	226	32	3 189	240	7.5
Finance	1	23	1	792	23	2.9
Real estate	0	21	.0	1 632	21	1.3
Prof services	82	346	41	10 214	387	3.8
Support services	11	59	7	1 753	63	3.6
Government	0	0	0	5	0	0.0
Education	0	4	0	499	4	0.8
Social work	0	12	0	812	12	1.5
Arts	2	35	2	613	35	5.7
Other services	0	39	0	838	39	4.7

Table A8.26 The value of imports and exports in euros and the average firm relative to turnover (Slovenia, 2008)

Sector	Export value (million euro)	Import value (million euro)	Relative export value (% to turnover)	Relative import value (% to turnover)
Agriculture	48.8	37.1	0.26	0.23
Mining	8.2	18.1	0.14	0.09
Manufacturing	8 420.0	5 880.0	0.43	0.36
Electricity	0.0	61.0	0.00	0.06
Water supply	76.5	20.2	0.30	0.12
Construction	23.1	193.0	0.21	0.17
Wholesale	798.0	7 510.0	0.29	0.42
Transportation	12.1	93.7	0.21	0.16
Hotels	1.6	21.5	0.38	0.16
Information	87.8	292.0	0.31	0.24
Finance	0.0	102.0	0.00	0.36
Real estate	0.0	2.8	0.00	0.20
Prof services	269.0	304.0	0.34	0.28
Support services	11.9	29.9	0.58	0.26
Government	0.0	0.0	0.00	0.00
Education	0.0	0.7	0.00	0.22
Social work	0.0	3.1	0.00	0.27
Arts	0.0	11.0	0.00	0.19
Other services	0.0	13.4	0.00	0.27

Table A8.27 The distribution of import and export value in million euros and relative to turnover (Slovenia, 2008)

	10p	20p	30p	40p	50p	60p	70p	80p	90p
Value export	0.11	0.22	0.36	0.57	0.87	1.38	2.36	4.19	9.55
Share export	0.03	0.09	0.13	0.20	0.29	0.39	0.52	0.66	0.81
Value import	0.06	0.11	0.17	0.25	0.39	0.57	0.91	1.64	4.05
Share import	0.06	0.13	0.20	0.27	0.34	0.41	0.48	0.57	0.69

Table A8.28 Number of importers, exporters and two-way traders (Spain, 2010)

Sector	Exporters	Importers	Two-way traders	Firms	Trading firms	Share trading firms
Agriculture	3 305	2 384	1 091		4 598	
Mining	202	239	75	2 743	366	13.3
Manufacturing	23 716	46 815	15 479	196 678	55 052	28.0
Electricity	50	32	33		49	
Water supply	226	270	143	6662	353	5.3
Construction						
Wholesale						
Transportation						
Hotels						
Information	541	1 434	328		1 647	
Finance						
Real estate						
Prof services						
Support services						
Government						
Education						
Social work						
Arts	38	73	10		101	

Table A8.29 The value of imports and exports in euros and the average firm relative to turnover (Spain, 2010)

Sector	Export value (million euro)	Import value (million euro)	Relative export value (% to turnover)	Relative import value (% to turnover)
Agriculture	10 232.8	4 606.1		
Mining	1 356.3	804.0	29.6	17.6
Manufacturing	125 677.1	126 158.1	27.0	27.1
Electricity	270.9	149.2	0.3	0.2
Water supply	541.5	3 521.2	3.6	23.2
Construction				
Wholesale				
Transportation				
Hotels				
Information	517.5	597.9		
Finance				
Real estate				
Prof services	5.0	0.4		
Support services				
Government				
Education				
Social work				
Arts	13.9	11.9		

Table A8.30 The distribution of import and export value in million euros and relative to turnover (Spain, 2010)

	10p	20p	30p	40p	50p	60p	70p	80p	90p
Value export	0.002	0.030	0.120	0.269	0.443	0.721	1.252	2.392	6.205
Share export									
Value import	0.000	0.001	0.005	0.033	0.130	0.282	0.499	0.971	2.680
Share import									

Table A8.31 Number of importers, exporters and two-way traders (Sweden, 2008)

Sector	Exporters	Importers	Two-way traders	Firms	Trading firms	Share trading firms
Agriculture	116	183	32	206 930	267	0.1
Mining						
Manufacturing	3 396	3 579	2 285	54 229	4 690	8.6
Electricity	7	66	6	1 524	67	4.4
Water supply	40	38	21	1 095	57	5.2
Construction	96	309	33	78 234	372	0.5
Wholesale	3 326	7 322	2 184	124 322	8 464	6.8
Transportation	88	135	18	29 118	205	0.7
Hotels	4	25	0	26 958	29	0.1
Information	101	153	47	16 741	207	1.2
Finance	3	14	1	5 647	16	0.3
Real estate	35	50	11	46 387	74	0.2
Prof services	305	372	115	141 751	562	0.4
Support services	72	131	26	29 317	177	0.6
Government						
Education	14	15	4	17 629	25	0.1
Social work	6	7	0	23 126	13	0.1
Arts	8	27	1	39 946	34	0.1
Other services	25	28	6	44 091	47	0.1

Table A32 value of imports and exports in euros and the average firm relative relative to turnover (Sweden, 2008)

Sector	Export value (million euro)	Import value (million euro)	Relative export value (% to turnover)	Relative import value (% to turnover)
Agriculture	123.8	61.5	0.03	0.05
Mining	1 132.1	1 117.8	0.34	0.02
Manufacturing	50 898.1	48 878.3	0.29	0.17
Electricity	710.3	710.3	0.26	0.04
Water supply	0.0	0.0	0.00	0.03
Construction	87.4	71.6	0.01	0.04
Wholesale	12 910.5	11 482.7	0.12	0.23
Transportation	1 005.2	231.3	0.10	0.06
Hotels	0.9	0.0	0.00	0.03
Information	82.3	69.3	0.03	0.02
Finance	4.5	0.0	0.45	0.13
Real estate	22.8	16.0	0.22	0.06
Prof services	2 282.7	0.0	0.18	0.03
Support services	67.2	48.5	0.02	0.05
Government				
Education	1.9	0.0	0.02	0.02
Social work	0.0	0.0	0.01	0.00
Arts	0.2	0.0	0.01	0.01
Other services	2.7	0.0	0.01	0.00

Table A33 The distribution of import and export value in million euros and relative to turnover (Sweden, 2008)

	10p	20p	30p	40p	50p	60p	70p	80p	9
Value xport	0.00	0.00	0.04	0.33	0.66	1.09	1.88	3.62	9.
Share export	0.00	0.00	0.01	0.05	0.10	0.18	0.27	0.39	0.
Value import	0.07	0.21	0.33	0.48	0.69	1.05	1.70	3.15	7.
Share import	0.02	0.05	0.09	0.15	0.21	0.29	0.39	0.51	0.

Table A8.34 Number of importers, exporters and two-way traders (UK, goods, 2010)

Sector	Exporters	Importers	Two-way traders	Firms	Trading firms	Share trading firms
Agriculture	2 590	3 550	1 298		4 842	
Mining	707	994	300		1 401	
Manufacturing	37 000	41 384	16 545		61 839	

Table A8.35 The value of imports and exports in euros and the average firm relative relative to turnover (UK, goods, 2010)

Sector	Export value (million euro)	Import value (million euro)	Relative export value (% to turnover)	Relative import value (% to turnover)
Agriculture	9 075.1	22 672.3		
Mining	28 256.3	10 856.8		
Manufacturing	123 941.9	180 687.9		

Table A8.36 The distribution of import and export value in million euros and relative to turnover (UK, goods, 2010)

	10p	20p	30p	40p	50p	60p	70p	80p	90p
Value export	0.01	0.07	0.15	0.23	0.33	0.48	0.74	1.23	2.58
Share export									
Value import	0.01	0.09	0.24	0.37	0.52	0.72	1.08	1.78	3.72
Share import									

Table A8.37 Number of importers, exporters and two-way traders (UK, services, 2003)

Sector	Exporters	Importers	Two-way traders	Firms	Trading firms	Share trading firms
Agriculture	0	0	0	21 933	0	0.0
Mining	30	33	17	1 226	46	3.8
Manufacturing	822	1228	422	153 751	1 628	1.1
Electricity, water supply	0	13	0	515	13	2.5
Construction	43	54	24	191 993	73	0.0
Wholesale	315	381	175	373 095	521	0.1
Transportation, communication	92	95	71	79 402	116	0.1
Hotels	0	13	0	120 346	13	0.0
Finance	224	127	91	1 023	260	25.4
Real estate, prof services, support services	1 805	1155	932	546 405	2 028	0.4
Government	0	0	0	2 479	0	0.0
Education	0	0	0	19 278	0	0.0
Social work	10	10	0	56 643	20	0.0
Arts, other services	120	127	65	166 761	182	0.1

Table A8.38 The value of imports and exports in euros and the average firm relative relative to turnover (UK, services, 2003)

Sector	Export value (million euro)	Import value (million euro)	Relative export value (% to turnover)	Relative import value (% to turnover)
Agriculture	0.0	0.0		
Mining	769.5	382.5		
Manufacturing	8 696.9	7 621.0		
Electricity, water supply	0.0	16.6		
Construction	28.0	99.6		
Wholesale	4 349.8	2 962.3		
Transportation, communication	5 260.0	4 616.6		
Hotels	0.0	8.0		
Finance	3 228.3	586.7		
Real estate, prof services, support services	22 260.6	6 592.6		
Government	0.0	0.0		
Education	0.0	0.0		
Social work	7.2	2.6		
Arts, other services	2 379.1	502.7		

Table A8.39 The distribution of import and export value in million euros and relative to turnover (UK, services, 2003)

	10p	20p	30p	40p	50p	60p	70p	80p	90p
Value export	0.01	0.02	0.04	0.08	0.16	0.27	0.49	0.99	2.58
Share export									
Value import	0.00	0.01	0.02	0.03	0.06	0.11	0.20	0.44	1.21
Share import									