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Improving measurement of manufacturing services for Germany

Prepared by the Deutsche Bundesbank and Federal Statistical Office of Germany[1]

Summary

To identify possible data gaps in the reporting of manufacturing services in Foreign Trade Statistics (FTS) and Balance of Payments Statistics (BOP), the National Statistical Office (Destatis) and the Deutsche Bundesbank launched a project in 2018 linking micro-data to cross-check the reporting population. Due to legal constraints this cross-check could only be conducted within the FTS Division of Destatis i.e. the project focus on major companies which report manufacturing service fees to the Deutsche Bundesbank. BOP Reporters without a match in FTS or with large discrepancies in values were contacted via e-mail or telephone to investigate possible rea-sons for the non-reporting/ under-reporting. The investigation turned out two major causes for differences in the reporting population or in values. Firstly, the reporting population is not completely identical for intra-EU trade. While in BOP the resident company providing or contracting the manufacturing service is the reporting agent, in FTS in contrast it is the non-resident trader who must be registered for VAT(Value Added Tax) purposes in the country where the service is provided in cases where the goods are not returning to the country of the principal. Secondly, both, resident traders as well as non-resident traders (VAT registered business) used incorrect transaction codes for purchases/sales instead of manufacturing.

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I. Project background and objective

1. To identify possible data gaps in the reporting of manufacturing services in Foreign Trade Statistics (FTS) and Balance of Payments Statistics (BOP), the Federal Statistical Office (Destatis) and the Deutsche Bundesbank launched a common project in 2018 linking micro-data to cross-check the reporting population.

2. The project was challenged by the fact that the exchange of micro-data between members of the European Statistical System (ESS) and the European System of Central Banks (ESCB) is currently not symmetrically regulated. In the case of BOP, Article 8a of Council Regulation (EC) No 2533/98 concerning the collection of statistical information by the European Central Bank allows the transmission of micro-data to Destatis. In contrast, the transmission of confidential information from Destatis to the Deutsche Bundesbank lacks a corresponding legal basis.

3. This fact has several implications for the common project. Firstly, the linking of micro-data to reconcile the reporting population from both statistics could only be conducted within the FTS Division. Secondly, the project focus on major companies which report manufacturing service fees to Deutsche Bundesbank. As a consequence, data gaps or false reporting could only be identified for FTS. Thirdly, a secondment from the Deutsche Bundesbank to Destatis was necessary to unite experts in the analysis of BOP and FTS data. Fourthly, information on identified companies that report to BOP but whose reports are incorrect, cannot be transmitted to BOP in order to exert necessary corrections.

4. The project was conducted in three phases. In the first phase the main focus was on the clarification of the legal situation and on methodological aspects, such as definitions and compilation practices. During the second phase an expert from Deutsche Bundesbank was seconded to Destatis to provide support in linking test data to get an initial impression on the reporting population. Phase three constituted a deep dive into major companies which report manufacturing service fees to BOP. Those BOP reporters without a corresponding match in FTS or with sizable discrepancies in reported values were contacted via e-mail and telephone by the FTS Division.

5. The remainder of this paper is structured as follows: Section two and three review the legal and methodological side of the exercise, describe the technical framework. and illustrate the intended procedure for the necessary cross-checks as well as the quantitative and qualitative results of the investigations. Section four holds the concluding remarks and describes further steps to achieve greater reconciliation of both, FTS and BOP in terms of manufacturing services.

II. Methodological and technical framework

6. Emerging trends in globalized economies induced substantial growth in cross-border production arrangements where different stages of production processes being partly or wholly undertaken by affiliates or outsourced to unrelated entities.[2] These arrangements are often termed as "processing" or "manufacturing services". The methodological concepts of processing in BOP and FTS are very similar, yet, there exist some deviations that are described in the following.

7. Firstly, in BOP the definition of manufacturing services is broader than the definition of processing in FTS (major transformation vs. any transformation). Secondly, the territorial coverage is different (cross border movement vs. any processing where the processor receives a fee from the owner). Thirdly, the valuation differs (statistical value vs. invoice value) and

[2] BPM6 p.162.

finally the coverage differs. Coverage rates differ in the sense that within the FTS it has to be differentiated between Intrastat and Extrastat. Companies liable to pay VAT in Germany whose scope of dispatches to other EU Member States or scope of arrivals from those countries exceed the specified thresholds (500,000 EUR / dispatches or 800,000 EUR /arrivals) in the previous and/or the current calendar year are obliged to report to Intrastat. However, these coverage rates refer to the statistical value and not to the invoice value. This implies that there is no direct relation to the reported value of manufacturing services. Commercial and non-commercial export and import transactions higher than or equal to 1,000 EUR or 1,000 kg are included in Extrastat. In contrast, within BOP German residents have to report payments exceeding 12,500 EUR that they either receive from non-residents (incoming payments) or make to non-residents (outgoing payments).

8. The linkage exercise has been conducted on the basis of two data sources. For FTS Companies' reports (Intrastat) on commodity flows to and from Germany where used.[3] In the case of processing the relevant NoTCs ('41'/'42' and '51'/'52') are indicated in both data sources. In terms of BOP, direct reports to the Deutsche Bundesbank referring to "contract manufacturing" where the main data source.

9. Concerning the technical framework, it is expected that companies which report flows of goods to FTS also report the related manufacturing services to BOP. However, as the respective reporters submit their reports to FTS and BOP under different technical identifiers some matching problems occur which could only be solved in part. A further challenge for the linkage of both statistics lies within possible different statistical units. PSIs reporting to BOP are always legal units, whereas PSIs reporting to FTS may be legal units or VAT groups. As a result, before linking both statistics, BOP data had to be processed in order to aggregate legal units to their respective VAT groups whenever they belong to a taxation unit.

III. Implementation

10. The implementation activities comprised two steps: The first step focused on the linkage between both statistics and the evaluation of matching rates. The analysis was restricted to 43 companies involved in inward processing and 63 companies involved in outward processing within EU partner countries (declarations to Intrastat). The second step concentrated on finding technical, methodological or qualitative reasons for the differences in reported values. For this purpose, the number of companies was reduced to 20 companies each direction i.e., inward and outward processing.

A. Macro-level Analysis

11. Due to the described legal constraints a secondment from an expert of Deutsche Bundesbank to Destatis was necessary in order to unite compilers from both institutes for the data analysis. The cross-check of micro-data was conducted in two stages: Firstly, it was investigated whether the reporting population in BOP and FTS are alike. Secondly, reported values were compared for PSIs who report transactions related to manufacturing services both, to BOP and FTS.

[3] The object of investigation was restricted to EU partner countries (Intrastat) due to the fact that the invoice value within Extrastat, collected by Customs is transmitted to FTS as an aggregated invoice value i.e., whenever a transaction comprises more than a single processing, purchase or sales operation, the respective invoice value does not correspond to the single operation. While in general a reconciliation of the reporting population would be feasible, plausibility checks in terms of reported values would lead to biased results.

12. It is expected that more companies should report inward and outward manufacturing services in BOP than related flows of goods in FTS, because some companies could be factoryless good producers whose goods do not cross the resident border neither before nor after processing or processed goods could be sold to the country where the processing took place (withdrawals).

13. When goods cross the border after processing, FTS receives information about the costs of the processing for the related goods through the invoice value. This information can be compared with the reported manufacturing services in BOP. However, if goods cross the border for processing and fully return to the owner in the initial member state of dispatch after processing[4] the invoice value could be slightly higher than the manufacturing service as in some cases the invoice value could also contain transportation and insurance costs.[5] In contrast, if goods cross the border for processing and do not fully return to the initial member states of dispatch[6] the invoice value should be lower than the manufacturing service as the invoice value only contains the costs related to the goods that return to the country. PSIs involved in outward processing, however, should report sales abroad to BOP.

14. Table 1 shows that matching rates are low, especially concerning inward processing. Only for 7 out of 43 companies associated with inward processing and for 29 out of 63 companies associated with outward processing a match within BOP and FTS could be found.

Table 1
Matching rates of BOP and FTS

	Match of BOP and FTS
Inward processing	7 out of 43 (16%)
Outward processing	29 out of 63 (46%)

15. The results of the comparison of the total value of inward and outward processing however were promising. According to Table 2 the total invoice value for inward processing reported to FTS (EUR 1,584 million) is slightly higher than the total value within BOP (EUR 1,356 million), whereas the respective values for outward processing are almost equal: EUR 2,627 million within FTS and EUR 2,619 million within BOP.

[4] inward processing: NoTC '41' and '51'; outward processing: NoTC '41' and '51'.

[5] This scenario requires that the processor bears the costs of insurance and transportation.

[6] inward processing: NoTC '41'/'42' and only a part returns as '51' while the other part will be declared as '52'; outward processing: NoTC '41'/'42' and only a part returns as '51'.

Table 2
Comparison of the total value for manufacturing services within BOP and FTS

	Balance of Payments Statistics	*Foreign Trade Statistics*
Inward processing	1,356	1,584
Outward processing	2,619	2,627

* Preliminary data for BOP Statistics / Reference year 2014

B. Micro-level Analysis

16. Table 3 presents the detailed results of the micro-level analysis on matches between BOP and FTS statistics. Regarding inward processing, 3 out of 7 companies reported the same values to both statistics or slightly higher values to FTS. This indicates that goods are imported to Germany for processing and are completely exported after processing, either returning to the same EU country they were originally sent from or to another EU country. The remaining four matches exhibit a bad fit: while two PSIs reported much higher values (> 60%) to FTS, the other two PSIs reported much lower values (< 40%) to FTS.

Table 3
Matching rates of BOP and FTS Statistics

	invoice value (FTS) ≥ manufacturing service (BOP)		*invoice value (FTS) < manufacturing service (BOP)*	
	Good fit* 50-60 %	Bad fit* >60 %	Good fit* 40 % - 49 %	Bad fit* <40 %
Inward processing	3 out of 7**	2 out of 7	n.a.	2 out of 7**
Outward processing	7 out of 29**	7 out of 29**	6 out of 29**	9 out of 29**

* fit = invoice value (FTS) / (manufacturing service (BOP) + invoice value (FTS)
** Reference value: Match between FTS and BOP Statistics

17. Within outward processing, 7 out of 29 companies reported equal or slightly higher values to one of both statistics. This indicates that goods are exported to EU countries for processing and are fully returned to Germany after processing. Another 7 PSIs reported much higher values (> 60%) to FTS. The remaining 15 PSIs reported lower values to FTS than to BOP. However, 6 out of 15 PSIs show a good fit which implies again that most of the processed goods return to Germany.

C. Contacting enterprises

18. The objective of the second step consists in finding technical, methodological or qualitative explanations for the low matching rates. For this purpose, the number of PSIs was reduced to 20 companies for each direction. The reference year was updated to 2017. Once both data sets were linked, those enterprises that could not be matched and those that could be matched but showed a considerable difference in reported values were identified and contacted in order to investigate the reason for the respective results.

19. Due to matching problems finally only 18 out of 20 inward processors and 13 out of 20 outward processors were contacted via telephone. For seventeen of the companies investigated, the differences in values can be explained by methodological reasons. By receiving information on the business models of the companies, it became clear that within a

company two different units are responsible for the reporting obligations i.e. one unit reports to BOP and another unit reports to FTS.

20. Many companies described the following business model that was identified as the main cause for deviations in FTS and BOP. A contracting company based in another EU country buying raw materials worldwide and/or producing intermediate goods sends those raw materials and/or those intermediate goods to a German contract processor for manufacturing services. After processing, the final goods are not returned to the owner, but are directly resold by the non-resident contracting company to either another EU country, to non-EU countries or to customers in Germany (withdrawals).

21. In order to be able to carry out this direct resale after processing in terms of VAT the non-resident contracting company must register for VAT purposes in Germany. It also has to report the provision of the contract processor in Germany with raw materials/intermediate goods from abroad (EU countries) as an intra-Community acquisition and the direct resale to another EU country as an intra-Community supply. Accordingly, the federal tax authority transmits an intra-Community acquisition and supply to Destatis (FTS). This is an indication for FTS to expect Intrastat declarations of intra-Community purchases and intra-Community sales, which have to be reported under NoTC '11' (acquisition/sale). However, from a methodological perspective, this transaction constitutes an inward processing operation in FTS, thus the declaration to FTS is not correct: The non-resident contracting company, exclusively registered in Germany for VAT purposes, has to report NoTC '42' for arrivals and NoTC '52' for dispatches. The part of processed goods which is directly sold by the non-resident contracting company to a German customer does not have to be reported to FTS in Germany. In contrast, the German inward processor has the obligation to report processing fees received to BOP. In the case of withdrawals, the German customer has to report these purchases additionally to BOP.

22. Concerning outward processing the investigation has identified a data gap for three companies: Two companies reported outward processing under NoTC '11' (acquisition/sale), instead of NoTC '41' for dispatches and NoTC '51' for arrivals. One company reported outward processing to BOP, even though it did not commission any outward processing. Further, for one company, the difference in values is due to the reporting threshold in BOP.

23. For the remaining eight companies, the differences in values draw on the inversed methodological explanation of the business model for inward processing described above: A German contracting company provides the outward processor (in the EU country) with raw materials or intermediate goods from abroad. After processing the final goods are directly sold to a customer in the processing country, another EU county or any third country. In this case, from the German point of view, goods do not pass the German border, nor when providing the outward processor with raw materials and/or intermediate goods nor after processing. Thus, the German contracting company does not have to report to FTS. But, it has to register for VAT purposes in the outward processing country and will report intra-Community sales to the turnover tax advance return in Germany. Therefore, in most of the cases, the German contracting company reports to FTS NoTC '11'. In contrast not only the manufacturing service charge has to be declared in BOP but also the purchase of raw materials and/or intermediate goods as well as the sale of the processed goods.

24. The reporting obligations change if any good within this process passes the German border e.g., if the German contracting company provides the outward processor with raw materials/intermediate goods from Germany and/or sells processed goods to a customer in Germany. In this case the goods crossing the German border have to be reported to FTS. If however the processed goods are sold to customers in Germany, it are the customers who are obliged to report to FTS. As they have no information about the 'previous' process of manufacturing they declare NoTC '11' for arrivals. From a methodological point of view this is incorrect. NoTC '51' would be appropriate in this case. In practice however, there is no

possibility for FTS to identify this flow, not even with BOP data, as the reporting agents would not coincide.

IV. Conclusion

25. The aim of the joint project on manufacturing services between Deutsche Bundesbank and Destatis was to investigate the reconciliation of data on manufacturing services and in particular to investigate the completeness of the current reporting population.

26. Decisive for this project was the feasibility to exchange microdata on manufacturing services between both institutions. Since the legal situation in Germany only allows the provision of BOP data to FTS and given the short timeframe for the extensive analysis on the company level, a full-edged analysis of the reporting population was difficult. Still, it was shown that based on the top reporters in BOP (inward and outward processing) the FTS reporting population was complete. Even the quality of FTS data, in terms of reported transaction codes, could be enhanced considerably. Only the comparison of both data sets enabled to identify those companies with which the FTS division needed to get in touch in order to understand the deviations occurring in both statistics and in order to instruct necessary corrections for FTS declarations.

27. The investigation turned out two major causes for differences of the reporting population and values. Firstly, the reporting population is not completely identical. While in BOP the resident company providing or contracting the manufacturing service is the reporting agent, in FTS in contrast it is the non-resident trader who must be registered for VAT purposes in the country where the service is provided in cases where the goods are not returning to the country of the principal. Secondly, both, resident traders as well as non-resident traders (VAT registered business) used incorrect transaction codes for purchases/sales instead of manufacturing services.

28. Given the encouraging results for FTS, it is expected that an exchange of micro data from FTS to BOP might exert similar positive effects. Since in cases where misreporting in BOP was identified, the legal framework prevented the use of these findings on a company level. However, during the analysis there was no evidence so far of any under-coverage of the reporting population in BOP.

29. One of the lessons learned from the common project was the extension of the FTS Intra-Community trade statistics General Guide 2018, which gives detailed instructions to the PSIs on reporting procedures and issues: Since January 2019 a particular section within the FTS Intra-Community trade statistics General Guide 2018 is dedicated to the description of non-resident contracting companies registering for VAT and contracting manufacturing services. It gives explanation on the reporting obligations and especially points out the correct declaration of the nature of transaction codes.

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