Tokyo 25th Meeting of the Wiesbaden Group on Business Registers
- International Roundtable on Business Survey Frames

Tokyo, 8 – 11 November 2016

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Statistics Austria
Session No. 4

Quality and coverage

Measures for ensuring the quality of the classification codes in the Austrian Statistical Business Register

1. Introduction

This paper deals with methods and measures taken in Austria with the aim to achieve a high quality of the assignment of the classification codes in the statistical business register. The main focus of the paper is on the activity classification (NACE Rev. 2; European version of ISIC Rev.4), but also aspects of the classification by institutional sectors according to the SNA 2008 and ESA 2010 respectively, are described. In the context of business statistics the activity classification is certainly the more important one, as it is essential for nearly all areas of business statistics and national accounts. Data published by economic branches (activities) belong to the standard disseminations of all business statistics. In contrast, the classification of the institutional sectors is primarily important for national accounts. However, its importance will grow as business statistics will become more integrated into the overall economic statistical system, which includes also statistics on non-market activities.

Furthermore, the classifications are not only important for the tabulation and publication of economic statistics. The coverage of a statistical domain is usually defined by references to an activity classification. However, from the point of the respondents the classification codes is usually one criterion to define whether the respondent has reporting obligation for a certain statistical survey or not. Last but not least, it should also be mentioned that the use of international classifications is a necessary, but not sufficient requirement for producing harmonised statistics.

Due to the dynamics in the enterprise population, due to usual lack of up-to-date information on the activities undertaken by each single enterprise and due to the principle of reducing response burden, it certainly cannot be ensured that all classification codes assigned in the statistical business register are correct. However, a 100% correctness of these codes would not be necessary for high-quality business statistics. A certain share of incorrect assignment of the classification codes will be unavoidable and will not necessarily have a significant effect on the resulting statistical data. Anyway, not all incorrect codes have the same effect on data quality. In general, the effect due to wrong classification codes will increase with the size of the enterprise. From a mere mathematical aspect the share of correctly assigned codes will be higher at the upper levels of the classification hierarchy.

The paper is structured into three main chapters. Chapter 2 focusses on the coding concepts and principles that are applied in Austria. These are of course based on international concepts. Chapter 3

describes the measures taken to achieve an acceptable quality of the classification codes in the statistical business register. The chapter starts with the so called classification notification which plays a central role in the assessment of the classification codes. The maintenance of the classification database is a further issue that contributes to the quality of the coding. Maintenance covers mainly integrating new activities and products and clarifying ambiguous activities. Co-operating with the Austrian National Bank, and with the national accounts and the business statistics directorate of Statistics Austria are further features of our quality policy. Last but no least systematic quality checks are performed.

2. Concepts and principles for coding

2.1 Activity classification

The application of international classifications is not an easy task. In order to support international harmonisation the definitions and rules of the classification are sometimes quite complex and would require appropriate information to codify an economic entity correctly. Furthermore, the economic entities usually perform more than one activity and thus a further task is to explore which is the main activity. According to the classification rules the value added for each activity should be known and the top-down-approach should be applied. In addition, there are further classification rules for specific activities (e.g. government sector) and for specific kinds of production (e.g. outsourcing, repair and installation). Furthermore, there is also the issue of the various statistical units and the consistency of the coding. For instance, a kind-of-activity unit cannot have a classification code that is neither the main activity of the enterprise nor one of its secondary activities. This is necessarily not so in case of local units. A local unit may have activities that are just ancillary ones and may thus have a classification code which is not one of the codes of the enterprise to which the local unit belongs.

Considering this complexity the question arises which would be the best method to fulfil or approximate these requirements. The answer to this question certainly varies over the countries. In this paper we will only present the Austrian principles.

The first consideration is that self-coding of the enterprises is the least preferred method because the enterprises are not experts in statistical classifications. Not only because of the complexity of the coding task, but also of the lower quality of the classification codes that might be expected. If the classification codes are of certain importance in taxation or other government administrative areas, it might be expected that the enterprise will select that code which they suppose is best suited for them with respect to the importance of the administrative issue.

A second option would be to use the classification codes that were assigned in administrative registers. In Austria as well as in many other countries there are administrative registers which also code the units. The quality will depend on various issues, such as: is the coding done in cooperation with the enterprise, is it based on appropriate descriptions provided by the enterprise. Do the administrative registers use the up-to-date classification, its descriptions and the available related materials for their coding work? Is the administrative register interested in the classification? Are the classification codes important for their own administrative purposes? Depending on the answer to these questions the quality of the coding might be different.

Classification codes assigned by administrative registers are certainly of help for the coding to be performed by the national statistical office. However, an assessment of the general coding quality is

necessary and measures need to be taken in order to avoid transferring too many incorrectly assigned codes into the statistical business register.

A third option would be that the coding work is the primary task of the national statistical office. This is the preferred option in Austria. Whatever method is applied the classifications codes assigned are under the responsibility of the statistical office.

Our basic concepts for assigning activity codes are:

- Ask the enterprise to provide information on the structure of their revenues/turnover (or make an estimate of the turnover structure by using data from business surveys, or any other valuable source);
- Transform the turnover structure into a value added structure;
- Derive the main and secondary activities by using the top-down approach.

This approach is guided by the following principles:

- Enterprises report what they are producing by referring to activities or goods and services that they find in our classification index (currently about 26 000 terms); no information is required using the structure, the elements or the rules of the classification itself;
- Enterprises should only provide estimates of the structure of their turnover in percentages; no absolute figures are requested;
- Turnover is the better proxy variable for the unknown value added; in general output based proxies are better suited than input-based ones;
- The transformation of the turnover structure into a value added structure is done by using value added shares derived from structural business statistics and from national accounts for activities which are not covered by the structural business statistics.
- Having thus derived a value added structure the top-down approach is applied automatically and will result in the delineation of the main activity and of the secondary activities of the enterprise.

Two examples should illustrate this methodological approach. The first one (see **table 1**) shows a case where the share of turnover between two activities is assumed to be 50% - 50%. The main activity will be the one with the greater share of value added. As can be seen in this example the value added share of the one activity is 0.507 and for the other 0.174. A simple calculation yields to the result that the first activity (C 2826) will be the main activity.

In the second example (see **table 2**) an enterprise reports three different activities which fall under three different sections of the ISIC classification (J, M and N). According to the top-down approach the coding work should start at the highest level of the classification: it should be determined which is the element of the highest classification level (section) that comprises 50% or more percent of value added or has at least a share that is higher than all the other elements. In this example based on turnover data none of the elements at the section level fulfils this condition (there are two with 40% each).

The same calculation as in example 1 with the appropriate value added shares gives the result that the activity of section N which has a turnover share of 40% will be the main activity as this activity yields 44.1% of the value added generated by that enterprise.

Table 1: Coding example 1

Enterprise A Activity	Turnover share (%)		weight (value added)	weighted turnover		Adjusted for added value quota (%)	Top down
Manufacture of machinery for textile production *(C 2826 "Manufacture of machinery for textile, apparels and leather production")*	50	x	0.507	25.35	/: 0.34	74.5	main activity
Wholesale trade of machinery for textile *(G 4659 "Wholesale of other machinery and equipment")*	50	x	0.174	8.70 _____ 34.05=100% 1%=0.34	/: 0.34	25.5	secondary activity

Table 2: Coding example 2

Enterprise B Activity	Turnover share (%)		weight (value added)	weighted turnover		Adjusted for added value quota (%)	Top down
Software development *(J 6201 "Computer programming activities)*	20	x	0.471	9.42	/: 0.53	17.8	secondary activity
Market research (*M 7320 " Market research and public opinion polling ")*	40	x	0.505	20.20	/: 0.53	38.1	secondary activity
Call Center *(N 8220 " Activities of call center")*	40	x	0.584	23.36 _____ 52.98=100% 1%=0.53	/: 0.53	44.1	main activity

The first example is straightforward as there are only two activities and it is well known that the value added share for trade is usually much smaller than for manufacturing. However, in other service industries the value added share due to the higher share of staff costs and the lesser share of intermediate consumption might be higher. In the case of example 2 the value added shares of the three activities are quite similar (0.471 – 0.584) and the determination of the main activity is not so obvious without using appropriate value added shares.

This approach of transforming the turnover structure into a value added structure does not work for activities where there is no concept of a turnover. This applies for the activities of the non-market sector but also to certain activities in the market sector, such as holding companies, head offices, etc. Such cases need clerical checking and decision.

As said above the data on value added are taken from structural business statistics and from national accounts. As value added shares change over time the data used in the coding methodology needs to be updated regularly. In order to avoid year to year changes, a three-year moving average should be

used. Of course the value added shares derived from structural business statistics, but also from national accounts, are not pure value added data for a certain activity as they are calculated from accounting data of statistical units (enterprises, establishments) which usually do have more than one activity.

2.2 Classification of the institutional sector

The classification of the institutional sectors is described in chapter 4 of the SNA 2008. The institutional sectors group together similar kinds of institutional units. Corporations, non-profit institutions (NPIs), government units and households are intrinsically different from each other in that their economic objectives, functions and behaviour are different:

- Corporations produce for the market and aim to sell their products at economically significant prices. Corporations can be grouped into financial and non-financial corporations.
- Government units organize and finance the provision of goods and services to individual households and to the community. Their products are usually provided free or at prices determined by considerations other than purely market forces.
- Households may also engage in the production of goods and services for the market. When the production units of the households are not separate legal entities, they remain part of the household.
- NPIs provide goods and services but not for the purpose of generating income or profit for the units that control or finance them. Those non-profit institutions that produce goods and services but do not sell them at economically significant prices and that are not controlled by government are viewed as non-profit institutions serving households (NPISHs). NPIs that deliver goods and services to customers at economically significant prices are viewed as corporations and belong to the corporation sector. NPIs that are controlled by government are treated as government units.

Five institutional sectors are distinguished: Non-financial corporations, financial corporations, general government, households and non-profit institutions serving households. The sectors may be divided into sub-sectors. The European System of Accounts (ESA 2010) includes also sub-sector levels.

From the above short description of the institutional sectors it is clear that for the correct coding additional information will be needed which is usually not available in administrative or other sources which are the usual sources for the maintenance of the statistical business register. One variable that can be used for the coding is the legal form of the units: Sole proprietor units should be classified to the household sector. The activity classification is only applicable for very specific sub-sectors. **Table 3** gives an overview of the relations between the sub-sector classification and the activity classification. There are only a few cases where an activity code can be used (automatically) for the determination of the sector code. These cases belong mainly to the financial corporation sector: there is a 1:1 correspondence between subsector central banks and the central bank activity in ISIC. The same applies for the sub-sector S.1314 Social Security Funds which has a 1:1 relation with ISIC class 8430. For most of the other institutional units their sector-classification cannot be derived from their activity classification.

Table 3: Correspondence between Activity Classification and Institutional Sectors

Sectors and sub-sectors according to ESA 2010				Activity Code (ISIC Rev. 4)
Sector Code	**Sector Title**	**Sub-Sector Code**	**Sub-Sector Title**	**Activity Code (ISIC Rev. 4)**
S.11	Non-financial corporations			all classes except divisions K 64, K 65, K 66
S.12	Financial corporations	S.121	Central bank	only class K 6411
		S.122	Deposit-taking corporations except the central bank	division K 64 (only Monetary Financial Institutions (MFI))
		S.123	Money market funds	only class K 6430
		S.124	Non-MMF investment funds	only class K 6430 (excluding money market funds S.123)
		S.125	Other financial intermediaries, except insurance corporations and pension funds	only division K 64 (excluding the classes K 6411 and K 6420 and MFI)
		S.126	Financial auxiliaries	only division K 66 (no sole proprietor enterprises) class M 7010 (head offices)
		S.127	Captive financial institutions and money lenders	class K 6420 (holding company, provident bank foundation, special purpose entity) class K 6430 (private foundations) class K 6492 (pawnbroker)
		S.128	Insurance corporations	division K 65 (except class K 6530)
		S.129	Pension funds	only class K 6530
S.13	General government	S.1311	Central government (excluding social security funds)	all classes
		S.1312	State government (excluding social security funds)	all classes
		S.1313	Local government (excluding social security funds)	all classes
		S.1314	Social security funds	only class O 8430
S.14	Households			all classes except divisions K 64, K 65 and section O
S.15	Non-profit institutions serving households			all classes of division P 85, groups Q 869, Q 872, Q 879, R 931, S 942, S 949

The easiest sector to be applied is certainly the household sector as the main criterion is the legal form, combined with the exclusion of certain activities (K 64, K 65 and O 84). However, in some cases also a size threshold is applied, meaning that a sole proprietor enterprise over a certain size should no longer be classified in the household sector, but should be attributed to the non-financial sector. The size threshold might be defined by the number of employees or by the size of the turnover. On the other hand, difficult sectors are the financial corporation sector and the general government sector as for both sectors specific additional information is needed.

3. Actions taken for the quality of the coding

3.1 The classification notification

The basic instrument for the communication with the enterprises concerning their activity classification is the so called “classification notification”. Statistics Austria is in accordance with § 21 Federal Statistics Act 2000 (BGBl. Nr. 163/1999, as amended) assigned to provide the activity code to all Austrian enterprises. A classification notification is sent to all newly recorded enterprises in the statistical business register, to enterprises where the activity code has changed and to enterprises when its name, legal form or address has changed.

Currently the notification is sent by postal mail. Furthermore, a webbased application where the enterprises can confirm or correct data is provided too. Of course, replies by postal mail, by fax or by telephone are accepted as well. In the notification letter enterprises are asked either to confirm their activity code or in case that the code seems not to be correct or no longer up-to-date to provide us with information on their actual activities:

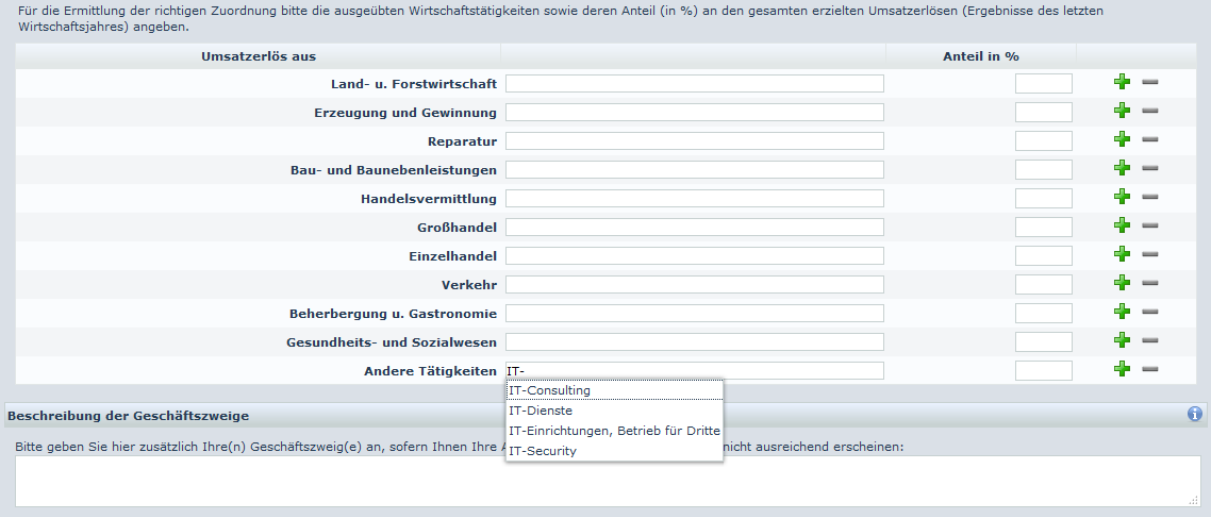
- The enterprise selects from the classification index one or more items which constitutes their output, and state the turnover percentage for each of these items.
- For easier use the whole set of activities is structured according to the main economic branches, such as agriculture, manufacturing, construction, wholesale trade, retail trade, etc.
- Within each branch the index items are organised as drop down fields and can easily be selected. Also products or activities that are not in our index can be typed in.

Figure 1 shows a screen shot of the table in our web-application that is to be filled in if the enterprise does not agree with the code provided or in case when the enterprise wants to provide us additional information on its activities.

The notification application does also allow downloading and printing the notification. Furthermore, the notification application covers also the main and secondary activities of the enterprise as well as of its local units. In the postal correspondence only the main activity of the enterprise is provided.

Every enterprise that is already registered in the Austrian Federal Government’s Centralised Web Portal has permanent access to its activity code and can send us feedback at any time.

Figure 1: Screen shot of the notification application showing the structure of information requested on turnover share for each economic activity performed (only available in German)



Some data should illustrate the importance of the classification notification for the activity coding. In 2014 Statistics Austria mailed about 47 000 classification notifications (see table 4). This means that 9.5% of all enterprises have been contacted with respect to their classification codes.

Table 4 shows the various reasons for mailing a notification: in two thirds of the cases a notification was mailed because the enterprise was newly recorded in the statistical business register. 9 200 notification were mailed because of a change in the activity code that was either requested by the enterprise itself or resulted from quality checks or in the course of business statistics surveys.

Table 4: Overview of all contacts with enterprises in relation to activity codes

Contact with enterprises	**2014**
Notifications sent to new enterprises	31.219
Change of activity has been requested by the enterprise itself	4.844
No change in the activity - the assignment was correct despite opposition of the enterprise	301
Secondary activities were additionally assigned - according to information of the enterprise or on the basis of research	440
Change of the name or the address of the enterprise	5.499
Activity of the unit changed due to research or in the course of business statistics surveys	4.364
Total number of enterprises in the statistical business register	**492.875**

In fact the response rate to the notifications is rather poor (about 50%). However, according to § 21 we assume that non-response can be interpreted as acceptance of the activity code mailed to the enterprise.

3.2 Classification database

Even if the maintenance of the classification database is not a direct quality policy of the activity codes in the statistical business register, it is an additional basis for the quality. The main issues are the updates of the classification indices and clarifications of specific activities or products.

Twice a year an update of the classification indices together with any further clarifications of the explanatory notes are published in the classification database on the website of Statistics Austria. The update refers mainly to new products and activities, such as for example e-cigarettes, wedding planner, dietician, LED lighting. Also the results of the Eurostat discussion forum are taken into account. The issues refer not only to new activities or products, but also to clarifications of the correct allocation of an activity or product, such as for example airbrush painting on motorcycles, animal genetic testing, electronic identification, object scanning in 3D, vending machine operations. Such discussions usual end up with a case law decision. Clarification decisions are also provided by the EU-Commission with respect to the correct classification of goods in the Combined Nomenclature which is used both for customs' and for statistical purposes. A recent example is how to classify Segways. Based on the relations between the European product and activity classifications the CN decision can be transformed into a clarification of the activity code.

3.3 Quality checks

a.) Co-operations with other units and institutions

We co-operate regularly with the Austrian National Bank, with the national accounts directorate and with the business statistics directorate of our office. The co-operation with the Austrian National Bank is based on a formal Co-operation Agreement and covers various statistical areas; the co-operation in the area of the statistical registers focusses mainly on the financial sector where we valuable information from the expertise and databases of the national bank is gathered.

The co-operation with our national accounts directorate refers to the sector classification, mainly of the general government sector and of the sector of the non-profit institutions serving households. As national accounts have to produce regularly the accounts of the government sectors, and especially the deficit and government debt data, they run a database listing the units belonging to the government sector. The final decision whether a unit belongs to the government sector or not, is always taken by national accounts.

The co-operation with our business statistics directorate focusses on the activity codes of the enterprises and the units belonging to them. The contact with the respondents and their replies to the business statistics questionnaires give indications whether an activity code is correct or not. If the code should be changed, a classification notification is automatically mailed to the enterprise. The co-operation is not only restricted to the coding of a certain statistical unit, also general classification issues are discussed in order to achieve a common understanding.

b.) Systematic quality checks

In addition to the above mentioned activities, systematic quality checks are undertaken as well. The intention is to check the activity codes of the statistical units in selected branches. Checking of the activity codes is also done ad hoc when a certain classification issue came up or a certain case law was decided. The systematic quality checks are based on our experience on the correctness and

stability of the activity codes over the various branches. Logically, the quality work should concentrate on those areas where a wrong activity code is more likely to exist and where a change of the main activity is more likely to occur. Some basic information on these criteria was gathered in the course of the recoding of the units to the NACE Rev.2 classification (Operation 2007). Because of the implementation of the new classification all enterprises received a classification notification which provided us with a database to perform such analysis.[1]

The quality checks are mainly performed using information found on the websites of the respective enterprises, or of professional organisations, like the Chamber of Commerce. Unfortunately, the information found might be quite different from case to case. Anyway, if the result of the check indicates a probable correction of the activity code a classification notification is sent to the enterprise.

A last but not least quality policy issue aims to avoid wrong coding in certain areas or in certain activities in that the use of certain index items are blocked. As there is only one central bank in Austria, no nuclear power plant, no aerospace transportation, an official list of hospitals, of monetary financial institutions, etc. about 150 index items cannot be used in the usual maintenance procedures. Only specific staff members are allowed to attribute such codes or to change a code of such a unit.

4. Conclusions

This contribution gave an overview of the main activities undertaken in Austria with respect to the quality of assignments of classification codes in the statistical business register. We are convinced that all these different kinds of activities are important and need to be performed. However, we are also convinced that the actions taken may not be sufficient. Unfortunately, we currently do not have overall and comprehensive quantitative indicators on the quality of the classification codes.

According to our basic principles we would like to intensify the contacts with the enterprises. This is only possible if we can fully use electronic ways of communication. Our web-based tool allows the enterprises to provide us their feedback electronically. The further development of Federal Government web portal will also provide new methods to electronically access all enterprises in the future. This would allow us to contact a greater share of enterprises or enterprises in a specific branch which is under a quality check.

[1] Norbert Rainer and Thomas Karner: Measuring and improving the NACE coding in the business register, paper presented at the meeting of the Wiesbaden Group on Business Registers, Wiesbaden, October 2007.