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The German Turnover Tax Statistics Panel

By Alexander Vogel and Stefan Dittrich

1. Introduction

Based on the yearly turnover tax statistics, the German turnover tax statistics panel allows for the first time detailed longitudinal analyses of nearly all economic sectors. In addition to turnover tax related variables, the dataset provides information about exports, imports and, due to the combination with the German business register (Unternehmensregister), information about employees liable to pay social insurance. The panel contains more than 4.3 million enterprises and 1.9 million of these are covered over the whole time period from 2001 to 2005. There is no other German statistics that covers nearly all economic sectors with such completeness.

In the following we give an overview of the turnover tax statistics and the matching process (sections 2 and 3). Section 4 describes the variables included in the dataset and in section 5 examples of the research potential are presented. The paper closes with information about the way of data access (section 6).

2. About the Data

The turnover tax statistics is a secondary statistics based on the monthly and quarterly advance turnover tax returns, meaning the turnover tax prepayments of the enterprises. Adjustments that occur only in the annual turnover tax declarations filled in later are not considered. The statistics includes all enterprises whose turnover (deliveries and other performances) exceeds the turnover threshold applicable according to the turnover tax law. Since 2003 this threshold has been EUR 17,500. Not included in the statistics are enterprises that only have to provide an annual turnover tax declaration,[1] enterprises with a turnover lower than the threshold and enterprises that achieve almost only non-taxable turnover. Furthermore there is only imprecise information about some economic branches like agriculture and forestry as well as the banking

[1] According to article 18 (2) of the turnover tax law only enterprises with a tax amount higher than EUR 512 in the previous year have to provide advance turnover tax returns.

and insurance sector. In the agriculture and forestry sector most enterprises are exempt from turnover tax and in the banking and insurance sector a large proportion of the enterprises' turnover is not declared because it is tax free without input tax deduction.[2]

As this is an enterprise-related statistics, analyses cannot be performed on the level of establishments (local units). The total annual turnover of all establishments of an enterprise is declared to the local tax office that is in charge of the district where the administration of the enterprise is located. Furthermore the turnover tax law allows tax groups of independent legal personalities if they are related in a financial, economic and organisational way.[3] In this case, too, the total turnover is declared.

3. Matching Process

Unlike real panel statistics, where units to be asked in the different periods are selected in advance, the difficulty in creating the turnover tax statistics panel was that existing annual data had to be linked ex post. The annual turnover tax statistics were in a first step linked to the German business register using direct identifiers like tax number and value added tax identification number. As turnover tax data are one of the principal sources of the German business register, not surprisingly in almost 98 % this linkage was successful. Foreign enterprises liable to declare turnover tax in Germany and enterprises of specific economic branches could not be matched as these units are not contained in the business register. After adding information about employees liable to pay social insurance and the business register identifier, the annual statistics were linked over time using the direct identifiers of tax number, value added tax identification number and business register identification number. Vague identifiers like the legal form or the economic activity code were not used. As the reliability of the identifiers differs, they were used consecutively – 99 % of all linkages were made by the tax number. Analysis showed no signs that different units were linked. On the other hand it was not possible to link enterprises e.g. in case of mergers, take-overs or demergers.

4. Variables Included

Due to the fact that the turnover tax statistics is a secondary statistics it includes mainly variables that are important for the turnover tax system. These are information about taxable and tax-free turnover, turnover tax before input tax deduction and deductible input tax (see table 1 for details). In the turnover

2 According to article 24 and article 4 of the turnover tax law.

3 According to the definition in article 2 (2) of the turnover tax law.

tax statistics turnover is defined as deliveries, other performances and the enterprise's own consumption (in short: deliveries and other performances).[4] In contrast to the majority of primary statistics the turnover definition includes not only turnover from operating activities, but also extraordinary income (e.g. from sales of fixed assets).

Table 1

Variables included in the Turnover Tax Statistics Panel

Regional reference (municipality level)
Economic sector
Duration of liability to pay taxes
Tax group dummy (according to article 2 (2) of the turnover tax law)
Legal form
Deliveries and other performances
Taxable deliveries and other performances
at 16 % (standard tax rate)
at 7 % (reduced tax rate)
Tax-free deliveries and other performances
With input tax deduction (zero-rated)
Intra-Community deliveries and other performances (within the EU)
Without input tax deduction
Turnover tax before deducting input tax
For deliveries and other performances
For intra-Community acquisitions (from EU member states)
Deductible input tax
For deliveries and other performances
From invoices of other enterprises
Import turnover tax
For intra-Community acquisitions (from EU member states)
Amount of intra-Community acquisitions (from EU member states)
Employees liable to pay social insurance (added from the business register)

Apart from these declared valuations the dataset contains a tax group dummy, the duration of liability to pay taxes, the legal form, a regional reference and the economic sector. The economic sector of the enterprise is defined by

[4] In terms of article 1 of the turnover tax law the taxable turnover also includes imports from EU member states (intra-Community acquisitions) and imports from non-EU states (turnover subject to import turnover tax). Regarding the needs of economic analyses, turnover in the turnover tax statistics is defined as deliveries and other performances only.

its main activity and is recorded by the tax office. Due to the fact that this information is not updated regularly (Treeck, 2004), this variable is adjusted in the production of the statistics by own research and with the German business register.

In addition to the variables from turnover tax statistics, the panel includes the number of employees liable to pay social insurance from the German business register. This variable is available for almost 45 % of the enterprises. Most of the enterprises without information from the business register are sole proprietorships (Einzelunternehmen), where it is reasonable to expect no employees liable to pay social insurance. Results of probit estimations for the manufacturing and the business services sector show furthermore that new enterprises, tax groups and enterprises with a foreign legal form are more likely to have no information about employees.[5] Reasons for that are found in the business register: New enterprises are covered with a time delay and foreign enterprises are not covered.

As a secondary statistics, the variables of the German turnover tax statistics panel are directly affected by changes in the turnover tax law. There are three important law changes between 2001 and 2005 that have to be considered. Firstly, there exist three different turnover thresholds. According to the applicable article 19 (1) of the turnover tax law, the yearly statistics includes all enterprises whose turnover exceeds EUR 16,617 in 2001, EUR 16,620 in 2002 and EUR 17,500 since 2003 (at current prices).[6] Secondly, there was a change in tax liability concerning especially construction work in 2004.[7] This law change affects especially the turnover reported in the building sector in 2004 (see Dittrich, 2006 for more details). Due to a change in declaration liability, data from 2005 on have been comparable to former years again. Finally the eastern enlargement of the European Union (EU) on the 1st of May 2004 has to be considered, while analysing intra-Community deliveries as well as intra-Community acquisitions.

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5 The following probit model is estimated separately for the manufacturing and the business services sector: The dependent variable is a dummy defined as 1 if the employee variable contains only a missing value and 0 if the number of employees is stated. The independent variables are the turnover, an export dummy, legal form dummies (reference category: corporations), a dummy for new enterprises and year dummies (reference: 2005). In addition it is controlled for Länder (federal states) and the economic activity (2-digit). Only for proprietorships, new enterprises, enterprises with foreign legal forms and enterprises with miscellaneous legal forms (concerns only a few cases) it is more likely to have no information about the employees (a p-value of less than 0.01 was considered significant).

6 To get a constant threshold over the whole period of the dataset (2001 to 2005) it is possible to set a user defined limit. In prices of 2001, the lowest constant threshold would be EUR 17,081. This is equivalent to the threshold in 2003.

7 The change in the relevant article 13b of the turnover tax law has been effective since the 1st of April 2004.

5. Potential Analyses

In this section we present some examples of potential analyses with the turnover tax statistics panel. Even if the dataset contains only a small number of variables it is nonetheless possible to analyse economic questions. The comparative advantage of the dataset is the possibility to investigate even enterprises and economic sectors that are underrepresented in other statistics. There is no other German statistics that covers nearly all economic sectors with such completeness.

5.1 International Activities

With information about the import and export activities of enterprises the turnover tax statistics allows an insight into international activities. However, neither exports nor imports are directly recorded in the dataset.

Regarding exports, the information about 'tax free turnover with input tax deduction' can be used as a proxy. This item contains mainly the exports of goods and some activities of minor importance like gold deliveries to central banks.[8] In addition, exports of goods within the EU (intra-Community deliveries and other performances) are directly included in the dataset.[9]

Unlike exports of goods, exports of services are not tax free but taxable and are therefore recorded under the item of taxable turnover.[10] Apart from this fundamental rule, due to exceptions in the turnover tax law, most services exports are not taxable in Germany but taxable abroad.[11] In both cases the exports of services are not identifiable separately. Thus, the item of 'tax free turnover with input tax deduction', in the case of services enterprises, contains exports of goods within service activities and within other activities (due to the fact that the economic activity of an enterprise is defined by its main activity). In addition, it could contain also exports of services because of incorrect declarations by the enterprises.[12]

Concerning import activities, imports from EU member states are reported under the item of 'intra-Community acquisitions'.[13] The amount of imports

[8] The item 'tax free turnover with input tax deduction' is defined in article 4 and 15 (3) of the turnover tax law.

[9] However, only exports to enterprises rather than to end costumers are recorded (with some exceptions in the case of distance and catalogue selling to end costumers within the EU).

[10] According to article 3a (1) of the turnover tax law.

[11] According to article 3a (2, 3, 4) of the turnover tax law.

[12] According to financial auditors and tax offices it is possible that the exports of services are incorrectly declared as 'tax free with input tax deduction' due to the complexity of the turnover tax law.

[13] According to article 1 (1) and 1a of the turnover tax law.

from states beyond the EU is not included in the turnover tax statistics. In this case an import turnover tax is charged by the customs authorities. Nonetheless, this import turnover tax is deductible as input tax and therefore reported in the dataset. With this information, at least two variables can be generated: Firstly, a dummy variable which shows if the enterprise imports from non-EU states (1 if the import turnover tax is greater than zero; 0 if no import turnover tax is deducted as input tax). And secondly, it is possible to compute an import intensity defined as the share of imports in total intermediate inputs.[14]

In summary, the exports of goods within and beyond the EU are identifiable in turnover tax statistics. For the analysis of the service sector, it is only possible to proxy the export activities of service enterprises by the exports of goods (see Vogel, 2008). Regarding imports, it is possible to generate an importer dummy as well as the import intensity for imports from EU and non-EU states.[15] The amount of imports is available only for imports from EU member states. This allows the distinction among enterprises that both import and export, only-exporters, only-importers and enterprises with no international activities.

To show the dynamics of international activities on the enterprise level, table 2 presents the ten most frequent patterns of export and import activities in the German manufacturing sector. 46 % of the enterprises that reported to the statistics in all five periods had neither export nor import activities between 2001 and 2005. In contrast, nearly 45 % of the total turnover in 2005 was contributed by enterprises with both export and import activities in every period. The dynamics of international activities on the enterprise level are obvious: 35 % of the enterprises changed their status in at least one year of the time period considered.

5.2 Productivity

Apart from the variables related to the turnover tax system, the panel includes the number of employees liable to pay social insurance. With this additional information it is possible to compute a simple measure of productivity: The labour productivity as turnover per employees liable to pay social insurance.

To get a variable that is partly comparable with the value added of the enterprises, Treeck (2004) discusses the computation of net turnover. Net turnover is defined as turnover less purchased inputs (based on the deductible input tax). Due to the fact that stock-keeping is not identifiable in the dataset and

[14] Approximately the share of deductible input tax for intra-Community acquisitions and import turnover tax in total deductible input tax is computed. In so doing, it is assumed that on the enterprise level, the mean tax rate for all inputs is almost equal. In the time period from 2001 to 2005, a standard tax rate of 16 % and a reduced tax rate of 7 % were valid in Germany (for both turnover tax and import turnover tax).

[15] According to article 1a (1) and 21 of the turnover tax law only imports of goods and not imports of services are included.

Table 2

The ten most frequent patterns of international activities in the manufacturing sector between 2001 and 2005

No.	Reporting year					% of enterprises	% of turnover 2005
	2001	2002	2003	2004	2005		
1	None	None	None	None	None	46,1	2,3
2	Imp & Exp	Imp & Exp	Imp & Exp	Imp & Exp	Imp & Exp	13,3	43,8
3	Export	Export	Export	Export	Export	3,1	1,1
4	Import	Import	Import	Import	Import	2,4	0,6
5	None	None	None	None	Export	1,7	0,2
6	Export	None	None	None	None	1,3	0,1
7	None	None	None	Export	None	1,0	0,1
8	None	None	None	None	Import	1,0	0,1
9	Import	None	None	None	None	0,9	0,1
10	None	Export	None	None	None	0,9	0,1

Note: None: Neither export nor import activities; Import: Only import activities; Export: Only export activities; Imp & Exp: Both import and export activities. Considered are only enterprises of the manufacturing sector (NACE divisions 15 to 36) that are active in all five periods (balanced panel). Tax groups are excluded from the computation.

purchased inputs can only be estimated, this approach causes negative net turnover values on the enterprise level. Thus, a measure of productivity that is similar to value added per employee cannot be generated. Caused by the limited variables available it is furthermore not possible to compute other, more appropriate measures of productivity like total factor productivity.

Nonetheless, the turnover based labour productivity provides the possibility to analyse productivity differentials or productivity growth rates.[16] As an example, Table 3 compares the productivity growth rates of exporting and non-exporting enterprises in the manufacturing sector. Between 2001 and 2004 and between 2002 and 2005 exporters show a clearly higher productivity growth than non-exporters. This is true for both parts of Germany.

5.3 SMEs and Market Entry of Enterprises

The turnover tax statistics covers all enterprises whose turnover exceeds the applicable turnover threshold (EUR 17,500 since 2003, see section 4 for more details). This allows not only analyses of small and medium-sized but also of micro enterprises and enterprises that enter the market.

[16] To absorb differences in the degree of vertical integration and capital intensity it is suggested to control for economic sectors on the 4-digit-level (see Wagner, 2007).

Table 3

Productivity growth rates of exporting and non-exporting manufacturing enterprises in eastern and western Germany

	Exporters		Non-exporters	
	mean (standard deviation)	number of enterprises	mean (standard deviation)	number of enterprises
Western Germany				
Productivity growth (in %)				
between 2001 and 2004	7.0 (44.2)	29,489	3.8 (48.4)	54,101
between 2002 and 2005	11.6 (46.2)	29,291	7.6 (50.5)	52,415
Eastern Germany				
Productivity growth (in %)				
between 2001 and 2004	12.6 (51.5)	3,177	7.6 (54.8)	15,271
between 2002 and 2005	16.6 (53.6)	3,328	12.3 (57.3)	14,662

Note: T-tests show statistically significant (alpha=1%) differences for all mean comparisons. Considered are only enterprises of the manufacturing sector (NACE divisions 15 to 36) with one or more employees liable to pay social insurance (tax groups are excluded). Furthermore only enterprises are considered that export or do not export over the whole respective period. To avoid bias by outliers, the 1st and the 99th percentile of the labour productivity distribution are excluded from all computations. Labour productivity is measured in prices of 2001.

In comparison with the cross sectional data of turnover tax statistics, the information about employees liable to pay social insurance included in the panel allows a better implementation of the SME definition recommended by the EU (European Commission, 2003). Thus, it is possible to generate the SME categories based on turnover as well as information about employees.

Enterprises that enter the market are defined in turnover tax statistics as enterprises whose liability to pay taxes starts in the reporting year and still persists in the following year. While interpreting the results it has to be considered that the entries are underestimated if the start of an enterprise is unequal to the liability to provide advance turnover tax returns.[17] Otherwise, 'false' entries occur in the case of new tax numbers due to legal form changes, internal reorganisations of the fiscal authorities or split-ups of enterprises (Gräb / Zwick, 2002).

5.4 Further Applications

Most commonly, turnover tax statistics is used to analyse the turnover and the number of tax payers in different economic sectors (see e.g. Dittrich, 2007). With the turnover tax statistics panel it is not only possible to analyse

[17] For example if the turnover does not exceed the turnover threshold.

the turnover development of economic sectors but also the dynamics of the turnover development within the economic sectors. In table 4 we present, as examples, the turnover growth for three selected economic sectors. The examples show that even growing economic sectors could be dominated by enterprises with decreasing turnover and that even in shrinking sectors growing enterprises can be found.

Table 4

Turnover growth within three selected economic sectors

Economic sector (NACE division)	Turnover of all enterprises in the sector		Turnover growth rate of the sector	Share of enterprises whose turnover . . .	
	2004	2005		increased	decreased
	in EUR million		in %	in %	
Manufacture of food products and beverages (15)	137,039	138,843	+1.3	37.2	62.8
Manufacture of radio, television and communication equipment (32)	76,520	75,063	–1.9	50.2	49.8
Manufacture of medical, precision and optical instruments (33)	40,961	42,021	+2.5	30.7	69.3

Note: Considered are only enterprises that are active in both periods 2004 and 2005 (balanced panel). Tax groups are excluded from the computation. Turnover is measured in prices of 2001.

Another application is the analysis of concentration. Due to the completeness of the enterprises covered it is possible without any problems to calculate indicators of absolute (e.g. concentration rates or the Herfindahl-Hirschmann index) as well as relative (e.g. the Gini coefficient) concentration (Vorgrimler et al., 2005). Additionally, the panel data offer the possibility of a more dynamic concentration analysis that takes account not only of the change of the concentration level but also of variations in the ranking of the enterprises (see e.g. Deutsch / Silber, 1995).

To enhance the potential of the Turnover Tax Statistic Panel there are at least three possibilities to add additional data. Firstly, the regional reference allows the integration of regional context variables such as the gross domestic product, the rate of unemployment or the tax rates of the region where the administration of the enterprise is located. Secondly, it would be possible to add more variables from the business register. And finally there is the future prospect of matching the panel with other data from official statistics' enterprise and establishment surveys.

6. Data Access

The access to micro-data of official statistics is provided by the research data centres of the German Federal Statistical Office and the statistical offices of the Länder.[18] The German turnover tax statistics panel is available via controlled remote data processing, which allows the analysis of the formally anonymised original data. This way of data access is open to all interested persons (including also foreign scientists and non-scientific persons). The panel is available in both the long and the wide format.

Until now, only cross sectional datasets of the turnover tax statistics are available in the form of de facto anonymised Scientific Use Files. The creation of standardised Scientific Use Files of panel data still needs further research.

References

Deutsch, J. / *Silber,* J. (1995): Static versus Dynamic Measures of Aggregate Concentration: The Case of Fortune's 500, Southern Economic Journal 62, 192 – 209.

Dittrich, S. (2006): Umsätze und ihre Besteuerung 2004, Wirtschaft und Statistik 10, 1055 – 1060.

Dittrich, S. (2007): Umsätze und ihre Besteuerung 2005, Wirtschaft und Statistik 10, 980 – 985.

Gräb, C. / *Zwick,* M. (2002): Die Umsatzsteuerstatistik, in Fritsch, M. / Grotz, R. (eds.), Das Gründungsgeschehen in Deutschland. Darstellung und Vergleich der Datenquellen, Heidelberg, 129 –140.

European Commission (2003): Commission Recommendation of 6th May 2003 concerning the definition of micro, small and medium-sized enterprises, 2003 / 361 / EC.

Treeck, H. J. (2004): Die Umsatzsteuerstatistik als Quelle wirtschaftsstatistischer Analysen, Statistische Analysen und Studien NRW 15, 3 – 10.

Vogel, A. (2008): Exports and Productivity in the German Business Services Sector. First Evidence from the Turnover Tax Statistics Panel, Working Paper Series in Economics, University of Lüneburg 89.

Vorgrimler, D. / *Dittrich,* S. / *Lenz,* R. / *Rosemann,* M. (2005): Wissenschaftliche Analysen mit Hilfe der amtlichen Umsatzsteuerstatistik, Wirtschaft und Statistik 10, 585 – 590.

Wagner, J. (2007): Exports and Productivity in Germany, Applied Economics Quarterly 53, 353 – 373.

Zühlke, S. / *Zwick,* M. / *Scharnhorst,* S. / *Wende,* T. (2004): The research data centres of the Federal Statistical Office and the statistical offices of the Länder, Schmollers Jahrbuch 124, 567 – 578.

[18] See Zühlke et al. (2004) and www.forschungsdatenzentrum.de for more details about the different ways of data access.