

Institut National de la Statistique et des Études Économiques

**A better taking into account of companies demography in
monthly turnover indexes by a complete exploitation of
monthly VAT returns**

Since 1976, INSEE has been using Value Added TAX (VAT) returns to produce monthly turnover indexes by sectors of economic activity. Until then, turnover indexes for any given year (Y) were calculated based on an annual sample of companies (more exactly about 150 000 legal units) in metropolitan France which declare the VAT monthly and in business at 31st December of year (Y-1) according to SIRENE register. The calculation way of indexes in relation to the year Y did not take into account companies starts-ups or bankruptcies, changes of sector, movements in the scope occurred during the year Y, the integration of those demographic changes taking place only from calculation of year (Y+1) indexes (based on a sample selected from data referenced at 31st December of year Y).

In the context of the project Harmonica¹ for renovating turnover indexes, reflections have been made to see a way of mitigating these limitations. Two distinct solutions were conceivable: using monthly rather than annual samples or calculating a turnover index over exhaustive data rather than over samples. The last solution was preferred and implemented. On the one hand, getting rid of from annual samples by using all monthly VAT returns completed by legal units whose head office is in France, and on the other hand, using on statistical register SIRUS instead of administrative register SIRENE, allows to take into account companies demographic events in nearly real time

Correcting the bias introduced by an incomplete taking into account companies starts-ups or bankruptcies: exploitation of exhaustiveness of VAT data

Monthly turnover indexes published until now were limited by a too partial taking into account of companies demographic events : turnover indexes calculated for any given year (Y) did not take into account legal units (LU) set up or ceased during the year Y, which could lead to a negative bias (respectively positive) of indexes in especially dynamic sectors (respectively depressed).

The new methodology computed to calculate turnover indexes is correcting this bias due to companies demography.

Moreover, as new indexes introduce demographic elements (starts-ups, bankruptcies, changes of sector, listing on the scope) , it is now possible to measure the impact of each demographic component on indexes' variations.

Using all monthly VAT returns in consistency with national accounts scope

The aim of turnover indexes is to provide infra-annual indexes of the economic situation, while waiting for annual accounts availability. So, it is natural to try to take the whole scope of companies and non financial individual firms. For practical purpose, selected scope for calculating turnover indexes in new methodology is matching with all legal units declaring VAT monthly and whose head office is in France including overseas departments². It covers 97% of turnover of hoped **theoretical** scope. The non-covered part is made up by legal units liable for VAT but not declaring it every month.

¹ The project of HARMONISATION of turnover indexes (Chiffre d'Affaires) ; HARMONICA

² Excluding companies based in French Guyana and Mayotte, which are not liable for VAT (Article 294-1 of Tax Code)

The integration of the non-monthly declarations in the calculation of the new indexes was not realised because the tests of monthly-payment of these declarations did not show themselves decisive.

For most of the 613 levels of the French classification of activities (NAF) for which turnover indexes are disseminated, covering by monthly declarations is excellent. Only about twenty of levels have a coverage rate under 75% but their added up turnover represents less than 1% of the whole turnover.

Measuring the impact of different demographic elements

As said, new turnover indexes of year Y take into account starts-ups and bankruptcies taking place during the year Y. They also take into account immediately entries in the scope or in the sector occurring during the year Y³. A LU which goes from sector S to sector T before (respectively after) the 15th of the month M will have its turnover of the month M assigned to the sector T for the month M (respectively to the sector S then to the sector T as of M+1) and so, as for its belonging won't be modified. With the previous method, turnover indexes included these changes of sector but with delay: taking into account the belonging to sector T was effective only as from January Y+1 indexes.

Demographic elements (starts-ups, bankruptcies, entries in the scope or sector) explain for the most part of the differences with current series. At level of NAF, the impact of starts-up / bankruptcies is the most significant component, except for some few sectors.

For most sectors, indexes calculated with new methodology are not so different from those previously published.

Methodology to calculate monthly turnover indexes

A General formula of index

The index for the month m of the sector S, I (m,S) is obtained by linking the variation of turnover of the sector S, EV(m, S) measured between the months m and m-12 and the index of the month m-12 of the sector S, I (m-12, S).

$$I(m,S)=I(m-12,S)\times EV(m,S)$$

This formula is used by recurrence since a base year⁴.

B Calculating formula of the variations of the indexes to take into account demography

To calculate the variations EV(m, S) of turnover between the months m and m-12 for the level S, the LUs that declare monthly VAT in month m are used.

³ By construction, new indexes don't take into account outgoing of sector or scope when calculating variations M/(M-12). So, it is a no-sense to measure their impact into the indexes.

⁴ The index of month m0 of the basic year is equal to the product of sales of the sector in the month m0 by a normalisation constant requiring that the arithmetic mean of the 12 monthly indexes of the basic year is equal to 100.

$$Ev(m, S) = \frac{TV_{permanent(m)}^m + TV_{entering\ sector(m)}^m + TV_{enteringscope(m)}^m + TV_{creations(m)}^m}{TV_{permanent(m)}^{m-12} + TV_{entering\ sector(m)}^{m-12} + TV_{enteringscope(m)}^{m-12} + TV_{closures(m)}^{m-12}}$$

with:

- TV^m permanent (m) is the sum of the total turnover of the permanent LUs of the level S for the month m,
- the permanent LUs of the level S for the month m are the LUs declaring monthly VAT in m and m-12, which are present in the level S in m and m-12,
- the entries in the sector are the LUs declaring monthly VAT in m and m-12, which are present in the level S in m , but in an another level disseminated in m-12,
- the listing on the scope are the LUs declaring monthly VAT in m and m-12, which are present in the level S in m, but in a level not disseminated⁵ in m-12,
- creations are the LUs declaring monthly VAT in m but not in m-12, which are present in the level S in m ,
- closures are the LUs that not declare VAT in m , which are present in the level S in m-12.

The numerator of the variation $Ev(m,S)$ of the indexes taking into account the demography is matching exactly the turnover in m of all the LUs which declared VAT on month m and whose activity sector on month m is S according to SIRUS, that is to say between 1 and 1.5 million of LU which declare by month. That especially means that the LUs set up between the end of the month m-12 and the end of the month m (so without any declared turnover in m-12 but with a turnover declared in m) are taken into account (creations between m-12/m).

Furthermore, the denominator of the variation $Ev(m,S)$ is defined so as to limit the danger of shortage of the series due to listing on or outgoing of sector (more rarely of scope) between m-12 and m which can often be due to either corrections of APE code (main business activity) or up-dating of their usual APE taking into account the variation of various activities, in case of companies with different important activities so that the main one can change over years. Concretely, the denominator consists of the same LUs that these declared in the numerator (LUs which declared the VAT on the month m and which activity sector is S on the month m) except those created between m-12 and m (which obviously have no turnover on m-12), plus the LUs ceased between m-12 and m (which really have a turnover in m-12).

For indexes that were published until now, the variation $Ev(m,S)$ was calculated over a sample of LUs limited to LUs which declared VAT on m-12 and m and whose activity level was S at 31/12/ Y-1 according to SIRENE, in other words, the permanent LUs on the sector between m-12 and m (about 150 000 LUs). This variation was equivalent to the ratio of turnovers of permanents of previous formula (except that the belonging to the sector S was defined at 31/12/Y-1).

Using news indexes, we will be able to measure the impact of a demographic component. We can measure the impact of starts-ups and bankruptcies on the series of indexes of the sector S excluding the factors attached to starts-ups and bankruptcies. Similarly, we can measure the impact of the listing on the scope (respectively sector) by excluding the masses attached to the listing on the scope (respectively sector).

⁵ Turnover indexes are disseminated for 613 levels other 732 levels present in the French classification of activities NAF. Are excluded especially levels of financial sector, agricultural sector and all the levels of non-market sectors

The demographic component with the most significant impact is starts-ups / bankruptcies. The exclusion of starts-ups and bankruptcies is indeed the main factor of difference between previously published indexes and new methodology indexes.

Comment: the turnover indexes scope consists of companies which declared monthly the VAT (that is equivalent to 97% of the turnover of all companies). Companies which declare now monthly while they were declaring annually or quarterly are considered as new companies. This bias is insignificant because symmetrically, some companies can change system and move from normal system to franchise system.

Significant modifications of simplified tax system (STS) occurred on 1st January, 2015, forcing companies with a VAT amount required in 2014 higher than 15 000 € to declare monthly starting from 2015 declarations. 250 000 legal units would be concerned for a VAT required amount of 8.3 billion €. This change of system was exceptionally processed as a listing on the scope and not as a start-up (to avoid a series break) and a monthly turnover was estimated for 2014.