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IS IT NECESSARY SO, TO SURVEY VERY SMALL FIRMS ?

A case study on retail trade and services to households

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SESSION 6

Small enterprises have been surveyed on selected industries in retail trade and

As far as statistics are concerned, small and medium enterprises are almost like protected species, protected from statistical burden. Indeed statisticians are encouraged to reduce sampling size and survey frequency when small firms are concerned. Everybody knows that a survey may be much more time consuming for small size enterprises than for larger ones because the latter are organized to fulfill a lot of administrative forms and they have often invested in an actual information system for their own management.

This special attention to SMEs is overwhelming the whole statistical system in France, and therefore every survey has to be confirmed regarding the necessity of involving small firms in the data collection. The point is particularly relevant for short term indicators, those indicators being more indice-types than absolute figures, more trends than levels.

So the question is for industries with an important share of their output produced by small firms, whether the smallest firms have a significant impact on the global trend. The question was recently put to INSEE about a monthly survey on turnover in commerce and service industries

This survey was introduced first to the Voorburg group in Ottawa in 1989. This was the launching year of the survey and so the presentation could only give the aims of the survey and nothing in terms of statistical results. Nine years later, the strong pressure already mentioned in favor of reducing statistical burden on small firms led INSEE to the conclusion that this survey had to be confirmed as a necessary survey for turnover monitoring.

Indeed, as it was explained in Ottawa, the turnover monitoring in France is based on VAT declarations and payments which have to be done every month to the fiscal authority when a firm has an annual turnover greater than 5 millions Francs in commerce or 1.5 millions Francs in services. Below these thresholds, firms are not liable to declare their turnover monthly but once a year only.

For some industries, retail trade and services to households specifically, more than 40 % of the total sales may be done by firms which are not liable to monthly VAT declarations. Generally speaking, those firms employ no more than 10 persons with an average between 0 and 5.

This is the reason why, for 37 detailed industries of retail trade and services to households, INSEE decided to supplement the monthly VAT source with a monthly survey on small firms in those industries.

The so-called monthly survey in commerce and services industries provides indices by industry which are aggregated with the ones which are issued from the VAT source.

The present paper gives the conclusions of a study which aimed to elaborate several indicators on similarities and differences between small and large firms in terms of seasonal variations, fluctuations and trends.

The study compared the series from the monthly survey to the VAT declarations.

The survey started from January 1989, but did collect data for the 12 months of 1988. The resulting field does not go as far back as it should for a cycle analysis, but 115 months were enough for comparing the two sources However, because of the changes in activity classification, which occurred with the adoption of NACE rev1 in 1993, 19 series only could be analyzed instead of the 37 initial ones.

List of the 19 industries covered by the study.

ISIC	NACE	NAF	LABEL
5220	52.21 52.22 52.23 52.24 52.25 52.26	52.2A 52.2C 52.2E 52.2G 52.2J 52.2L	Retail sale of fruit and vegetables Retail sale of meat and meat products Retail sale of fish, crustaceans and mollusks Retail sale of bread, cakes, flour and sugar confectionery Retail sale of alcoholic and other beverages Retail sale of tobacco products
5232p	52.42 52.43	52.4C 52.4E 52.4F	Retail sale of clothing Retail sale of footwear Retail sale of leather goods
5239p	52.47 52.48p 52.48p 52.48p	52.4R 52.4T 52.4V 52.4X	Retail sale of books, newspapers and stationery Retail sale of photographic, optical & precision equipment Retail sale of clocks, watches and jewellery Retail sale of flowers, plants, seeds
5510p	55.11	55.1A	Hotels and motels, with restaurant
5520p	55.40	55.4A	Bars
9301p	93.01p	93.0B	Laundering and (dry-) cleaning, pressing, and so on...
9302	93.02	93.0D 93.0E	Hairdressing Beauty treatment
9309p	93.05	93.0N	Other social activities

NAF : Nomenclature d'Activités Françaises
French classification of activities

The basic material of the study being monthly series of turnover by industries, obtained from VAT declarations and from the monthly survey, the preliminary step was the calculation of

- Turnover indices at 1980 prices
- Coefficients of seasonal and working days adjustment

The study could start with series of **Turnover indices seasonally and working days adjusted, in 1980 prices**, as input for the following comparisons, which deal with seasonal variations, trends and deviations from the trends.

In the rest of the paper, « small and large enterprises » mean enterprises exempted from and liable to monthly VAT declarations.

COMPARING SEASONAL VARIATIONS

After analysis on graphics and tests of equality of variances, the score of each industry is classified according to the coherence of seasonal profiles of the two sizes clusters of enterprises :

=	Same seasonal variations for small and large enterprises
≈	Same seasonal variations, but differences in amplitude of fluctuations
≠	Not the same seasonal variations

From graphic analysis, it can be deduced that seasonal variations of small and large enterprises are not the same for 7 industries out of 19, while only 4 have similar seasonal variations of comparable amplitude.

The detailed conclusions by industries are shown on the diagram page 7

COMPARING TRENDS AND DEVIATIONS FROM THE TRENDS

Different methods can be used when trying to identify the trend. It is well known, indeed, that, in such matters, there is no room for indisputable demonstrations, and one has to keep in mind the assumptions underlying the methodology used. So that different methods will lead to different trends. To cross-check the findings, the present study applied two methods. The first, a determinist evaluation of trends, the second, the Holdrick-Prescott filter.

1 Determinist evaluation of the trends

Trends are here considered as growth rates which are assumed to be constant. The deviations from the trends are then the fluctuations. Trends are computed by linear regression.

As a result of evaluations of the growth rate from two sources (VAT and survey) two opposite groups of industries are met :

= Industries with positive or negative but similar trends, no matter the enterprises size.

≠ Industries with opposite trends for small and large enterprises.

2 Holdrick-Prescott filter : empirical smoothing method

Trend calculation :

The trend is calculated by minimizing the equation in parenthesis :

$$\text{Min} \left\{ \sum_{1}^{n} (T_t - y_t)^2 + l \sum_{3}^{n} [(T_t - T_{t-1}) - (T_{t-1} - T_{t-2})]^2 \right\}$$

y_t values of the serie on month t

T_t trend of the serie on month t

λ coefficient

The optimization is done on T

Fluctuations evaluation : Calculation of the deviation by industries between the seasonal and working days adjusted serie and the estimated trend.

A contrary to the determinist method, the growth rate here is changing with the time. That is a compromise between linear trend and fluctuations, the last being a mix of cycle and erratic variations.

Fluctuations are represented by the deviation from the trend, $T_t - y_t$

Trend moves are represented by $\Delta T_t - \Delta T_{t-1}$

The more λ increases, the more the trend is stable and the less fluctuations are important.

λ is adjusted by continual approach in order to fix the trend and to minimize fluctuations amplitude.

Trend phases definition : Relative to its absolute value, the growth rate on six moving months may reflect a phase of

stability	when	it is lower than 0.4 %
increase or decrease	when	it is between 0.4 and 1.25 %
strong increase or decrease	when	it is higher than 1.25 %

Similarities and differences by industries

The outcome of the application is that three circumstances may be met :

= Identical phases, i.e. stability, increase or decrease at the same time for small and large enterprises

≠ Different phases : smaller enterprises increase while larger decrease, or smaller enterprises are stable while larger strongly increase, and so on...

// Shift in phases : there is a continuous lag or advance between the clusters sizes of enterprises

3 Economic fluctuations analysis

After calculation of trends and deviations from the trends, the next step consists in pinpointing reversal points and cutting growth and recession phases out of the cycles. To do that, the two methods start from spotting local extremes and changes in gradients.

Pinpointing reversal points may be done on turnovers, growth rates or deviations from trends.

The method used here is taken from the so called « Phase Trend Average (PTA)» method, which is advocated by OECD. This method aims to detect potential reversal points by scrutinizing local extremes in deviations from the trends. Results are controlled through considerations on fluctuations duration and correspondence of the phases division with economic facts. The sole fluctuations duration criterion were used in the present study.

According to the PTA method, identifying reversal points can't easily be directly done from deviations from time series seasonally and working days adjusted. Such series indeed still include erratic moves which confuse the analysis.

To get rid of erratic moves, time series have to be smoothed, but the smoothing process is not always safe because of some artificial shifts which may be generated by it. That is the reason why the PTA method compares reversal points issued from deviations from the trends time series to moving average series.

Three sorts of mobile averages are used

M6 moving average on 6 months (or less)
M12 moving average on 12 months
MSP Spencer moving average on 15 months

Analysis conclusions : the final outcome of the fluctuations comparisons are brought together in three items

= Same fluctuations :
reversal points occur at the same time or are no more distant than 4 months

≠ Different fluctuations :
On period exceeding 12 months, one is expanding while the other is declining

∩ Fluctuations fitted together :
One is having one fluctuation while the other is having two

DECISION TABLE

INDUSTRIES	SEASON	TREND		FLUCTUA-TIONS	σ	WEIGHT	DECISION
(1)	(2)	DT	HP	(4)	(5)	(6)	PROPOSAL
52.2A	≈	=	//	∩	3.48	46%	TO BE KEPT.
52.2C	≠	=	=	=	2.53	48%	SUPPRESSION
52.2E	≠	=	//	=	4.97	61%	SUPPRESSION
52.2G	≠	≠	≠	≠	9.92	44%	TO BE KEPT.
52.2J	≈	=	//	≠	6.68	37%	TO BE KEPT.
52.2L	=	≠	≠	∩	8.94	87%	TO BE KEPT.
52.4C	=	=	≠	≠	3.42	21%	SUPPRESSION
52.4E	≈	≠	≠	≠	4.27	17%	SUPPRESSION
52.4F	≈	=	≠	≠	5.35	29%	SUPPRESSION
52.4R	≠	=	≠	∩	3.53	34%	TO BE KEPT.
52.4T	≠	=	//	∩	3.27	26%	SUPPRESSION
52.4V	=	≠	≠	=	4.02	29%	TO BE KEPT.
52.4X	≈	≠	≠	?	6.24	45%	TO BE KEPT.
55.1A	≈	=	//	=	3.16	35%	SUPPRESSION
55.4A	≠	=	=	∩	3.83	81%	SUPPRESSION
93.0B	≈	=	//	≠	5.17	78%	TO BE KEPT.
93.0D	≈	=	=	≠	3.25	79%	TO BE KEPT.
93.0E	=	=	//	∩	6.73	84%	TO BE KEPT.
93.0N	≠	=	≠	≠	9.37	74%	SUPPRESSION

(1) Label and coding of each industry see page 4
(2) Season comparison page 5
(DT) Determinist evaluation of the trends page 5
(HP) Holdrick-Prescott filter page 5 & 6
(4) Fluctuations : deviations to the trends page 6
(5) σ : standard deviation of the indices when comparing small et large enterprises
(6) Weight : Share of the small enterprises in the total turnover
(7) shadowed lines mean some uncertainty in the decision

The table above shows the findings by industries and the decision taken at the end.

Despite the wording « decision » , « suppression » and « to be kept », it should be understood that a decision is but proposed in that direction, but there are factors to be taken in account which may lead to the opposite direction

The main criteria here for opting to suppression or conservation of the survey is mainly based on the following considerations by decreasing priorities :

1 **The share of the small enterprises in the total turnover**
The standard deviation of the two series of indices

The smaller the two figures, the less the survey should be confirmed. That is the case for retail trade of clothing, footwear, leather goods and optical equipment (54.2 C,E,F, T), and Hotels and bars (55.1A, 4A)

On the contrary, where the turnover share of small enterprises is very high, the survey must be kept. See the series of services to households 93.0B, D, E. The sole exception here are the bars because of too little differences in trend and fluctuations.

2 **The trends**

When the two methods, DT and HP, agree on differences in trends, the survey should be kept.
The sole exception is the retail trade of footwear (52.4E) because of the turnover share.

A good correspondence leads to the opposite conclusion : the survey is not essential, and so can be abandoned. See the retail trades of meat and fishes (52.2C, E)

Special case
93.0N, other social activities : the survey can't be kept any longer because of the heterogeneous definition of the industry. In other words, too vague groupings make too difficult the interpretation on turnover variations in the short term

CONCLUSIONS

Preliminary remarks

1 The study concentrates on 19 industries out of 37 which all belong to retail trade or services to households industries. Those industries were selected from the beginning as badly represented by the sole enterprises which are liable to monthly VAT declarations. Nine years after, the selection would be quite similar, the turnover share of small enterprises being still important in those sectors.
But that is not to say that all other industries out of the two mentioned domains are well represented by the large enterprises.

2 The characteristic under examination is the turnover. Initially, the VAT declarations contained information on investment as well, but the fiscal authorities cancelled that characteristic for administrative burden motivation, in 1992, despite its usefulness. It is quite clear that the same study would have led to different conclusions if the characteristic on the spot would have been investment.

Conclusions

3 As far as turnover is concerned, the nine years evidence of the survey on small enterprises leads to the conclusion that seasonal variations, trends and fluctuations may be different enough to consider that small and large enterprises do not have similar evolution in the short term for all industries, in retail trade and services to households at least.

4 Where small enterprises have a significant turnover share, differences in trends and fluctuations may twist the turnover monitoring if the coverage is restricted to larger firms. The study confirms indeed the relevance of a survey for 10 industries out of 19, by consideration of the two factors, turnover share and differences in trends and fluctuations.

5 But for at least 7 cases out of 19, it is not easy to strike a balance between the different findings of the study and other factors of economic nature.

Increasing market competitions weigh on performances of small enterprises. Their turnover share may progressively decrease against the large enterprises ones. Then, if the turnover monitoring is restricted to the latter, through VAT declarations for instance, the apparent turnover will expand but only because of small enterprises exclusion of the sample.

The story is quite common to most industries in retail trade, but it could occur to any sector in the future. In other words, the justification of the survey may be based on economic expectations which will be better detected with the support of long term time series.

Questions

1 Where small enterprises represent an important share of the total turnover, how is it possible to measure the quality of a turnover monitoring which would be restricted to large enterprises ? That a crucial question which stifles statisticians from blindly restricting a survey.

2 Since statistical agencies are committed to lighten the statistical burden on small enterprises, which are the best solutions for collecting a single data like turnover ?
survey less frequently ? but what about the monthly variations ?
use electronic transmission ? but most small enterprises aren't used to.

Annex 1

WEIGHTS OF SMALL ENTERPRISES BY INDUSTRY

CITI	NACE	NAF	Weight in terms of turnover (monthly survey) (%)	Weight in terms of enterprises (monthly survey) (%)
1511	15.13	151F	79.3	79.1
1541	15.81	158B	70.6	85.3
1541	15.81	158C	79.6	83.3

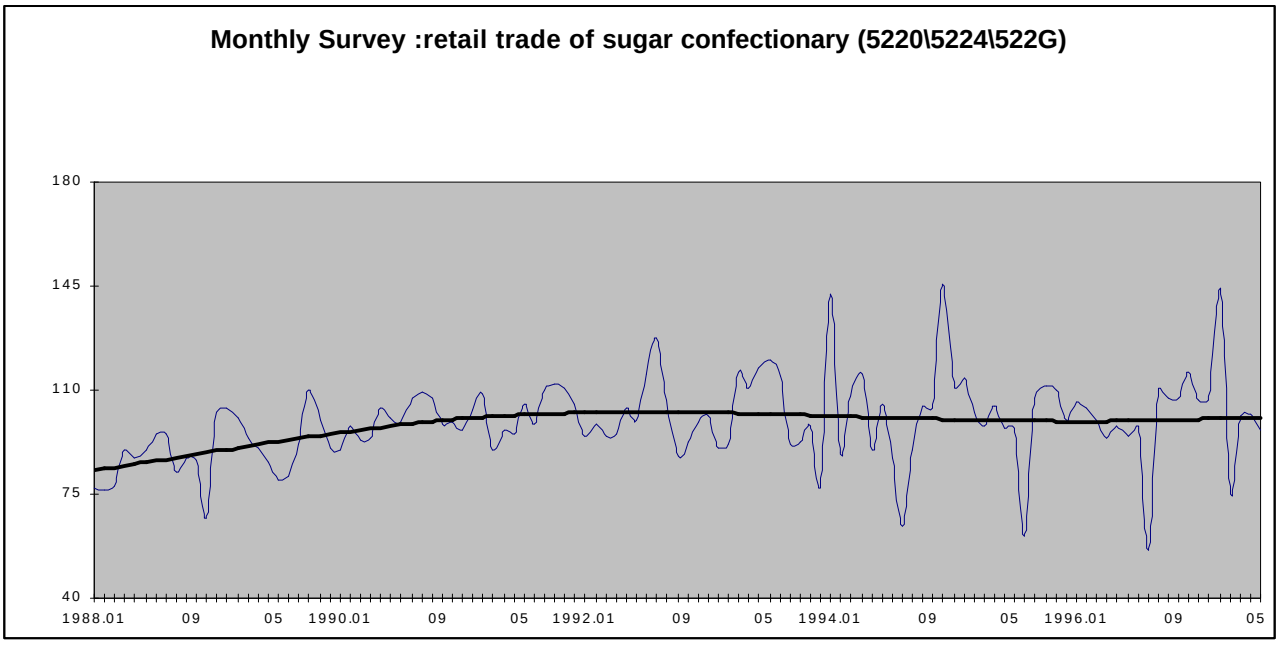
5251	52.61	526B	10.0	66.4
5252	52.62	526D	92.6	91.9
5252	52.62	526E	80.1	95.3
5259	52.63	526G	32.8	68.8
5259	52.63	526H	42.5	61.9
5260	52.71	527A	94.9	97.7
5260	52.72	527C	68.8	73.2
5260	52.72	527D	61.4	69.3
5260	52.73	527F	69.8	89.2
5260	52.74	527H	64.2	84.9

Annex 1

WEIGHTS OF SMALL ENTERPRISES BY INDUSTRY

CITI	NACE	NAF	Weight in terms of enterprises (%)	Weight in terms of turnover (%)
5510	55.11	551A	64,0	31,9
5510	55.12	551C	55,4	23,6
5510	55.12	551D	86,7	77,3
5520	55.30	553A	76,0	44,1
5520	55.30	553B	79,8	30,9
5520	55.40	554A	92,6	81,3
5520	55.40	554B	94,3	84,0
5520	55.51	555A	84,9	51,7
5520	55.52	555C	31,3	3,1
5520	55.52	555D	58,9	32,1
6304	63.30	633Z	25,0	8,8
6412	64.12	641C	75,2	23,2
6420	64.20	642A	0,0	0,0
6420	64.20	642B	21,1	4,1
7010	70.11	701A	25,2	20,6
7010	70.11	701B	16,3	43,8
7010	70.11	701C	21,9	11,9
7010	70.11	701D	33,9	28,0
7010	70.12	701F	31,9	20,2
7010	70.20	702A	59,6	85,4
7010	70.12	702B	27,0	3,9
7010	70.12	702C	43,5	17,8
7020	70.31	703A	34,8	19,0
7020	70.32	703C	28,9	12,4
7020	70.32	703D	21,7	14,8
7111	71.10	711Z	29,7	9,9
7111	71.21	712A	36,1	19,7
7112	71.22	712C	56,3	38,8
7113	71.23	712E	48,0	12,0
7121	71.31	713A	96,2	90,0
7122	71.32	713C	39,7	22,5
7123	71.33	713E	23,3	10,7
7129	71.34	713G	44,1	19,1
7130	71.40	714A	27,9	24,4
7130	71.40	714B	71,4	24,3
7210	72.10	721Z	35,3	21,8
7220	72.20	722Z	30,6	13,5
7230	72.30	723Z	41,7	19,4
7240	72.40	724Z	33,9	11,4
7250	72.50	725Z	57,8	21,8
7411	74.11	741A	6,8	5,0
7412	74.12	741C	13,1	11,2
7413	74.13	741E	22,1	12,4
7414	74.14	741G	26,7	11,0
7414	74.15	741J	16,4	33,1
7421	74.20	742A	17,3	18,5

7421	74.20	742B	18,0	12,3
7421	74.20	742C	25,4	12,3
7422	74.30	743A	44,1	31,7
7422	74.30	743B	35,7	18,1
7430	74.40	744A	47,6	7,5
7430	74.40	744B	32,0	16,5
7491	74.50	745A	23,4	27,2
7491	74.50	745B	17,5	3,2
7492	74.60	746Z	48,8	11,6
7493	74.70	747Z	68,8	16,9
7494	74.81	748A	64,6	40,8
7494	74.81	748B	60,0	17,3
7495	74.82	748D	44,5	20,1
7499	74.83	748F	52,1	34,7
7499	74.82	748G	41,9	9,8
7499	74.84	748J	33,6	15,1
7499	74.84	748K	48,8	33,9
9000	90.00	900A	48,1	19,5
9000	90.00	900B	33,3	7,0
9000	90.00	900C	21,7	5,2
9211	92.11	921A	19,8	3,7
9211	92.11	921B	31,3	12,0
9211	92.11	921C	34,0	8,5
9211	92.11	921D	24,6	4,8
9211	92.12	921F	19,9	4,3
9211	92.12	921G	48,5	10,9
9212	92.13	921J	30,7	8,2
9213	92.20	922A	61,2	20,5
9213	92.20	922B	17,9	13,5
9213	92.20	922C	30,9	2,8
9220	92.40	924Z	38,5	3,5
9301	93.01	930A	40,2	28,2
9301	93.01	930B	73,5	44,7
9302	93.02	930D	88,0	66,4
9302	93.02	930E	90,5	80,7
9303	93.03	930G	66,3	48,5
9303	93.03	930H	53,9	17,9
9309	93.04	930K	28,1	8,0
9309	93.04	930L	68,1	52,8
9309	93.05	930N	69,5	42,1


Monthly Survey :retail trade of sugar confectionary (5220\5224\522G)
180
145
110
75
40
1988.01
09
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1990.01
09
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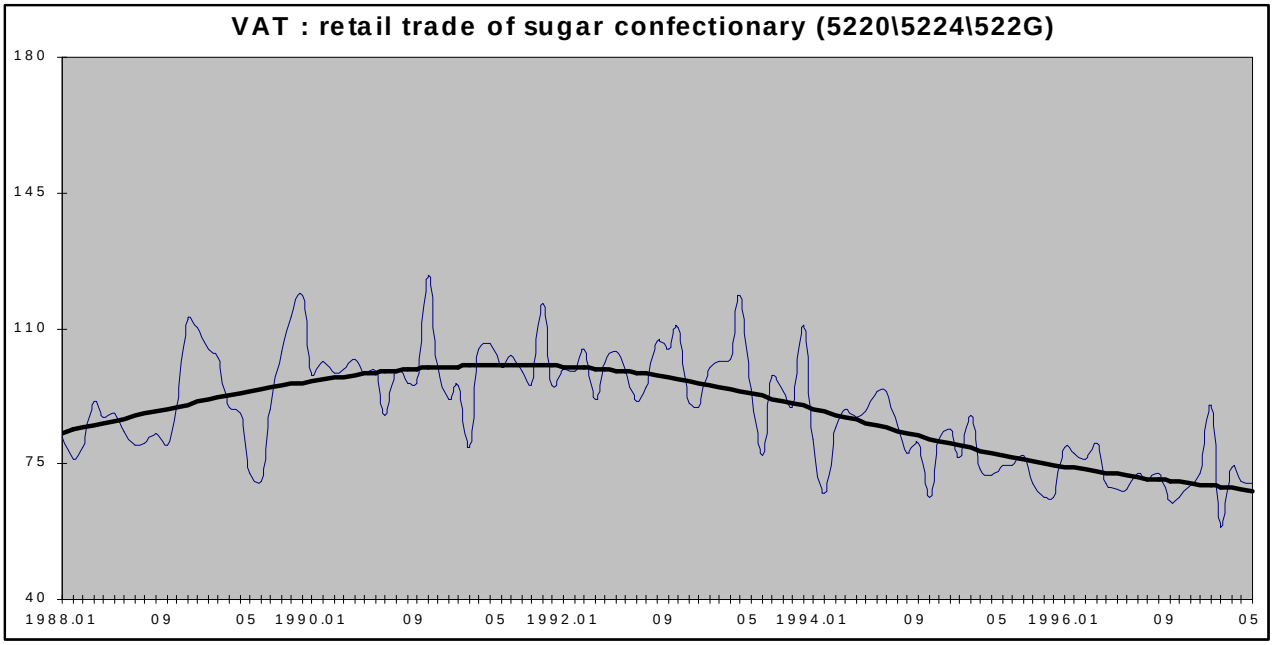
1992.01
09
05
1994.01
09
05
1996.01
09
05


VAT : retail trade of sugar confectionary (5220\5224\522G)
180
145
110
75
40
1988.01
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1990.01
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1992.01
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05
1994.01
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1996.01
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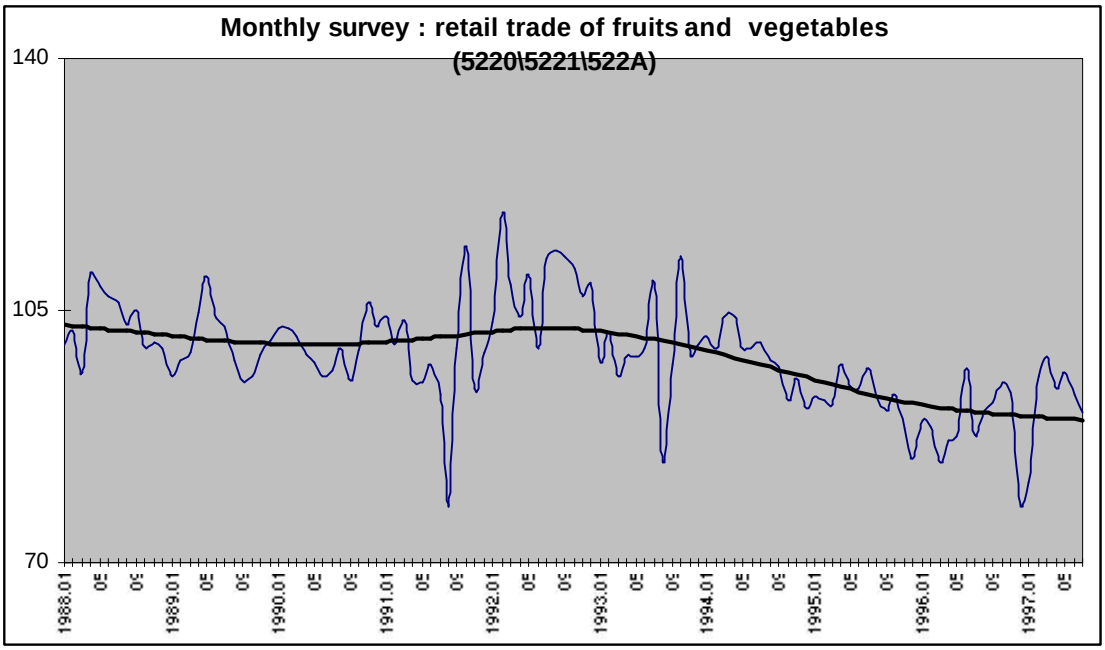
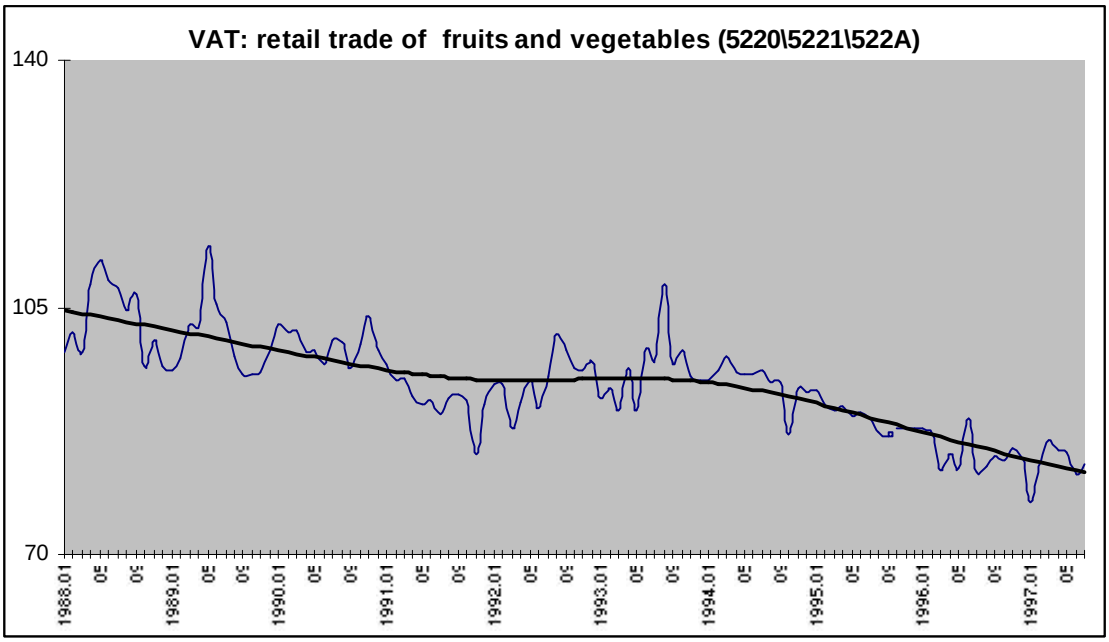
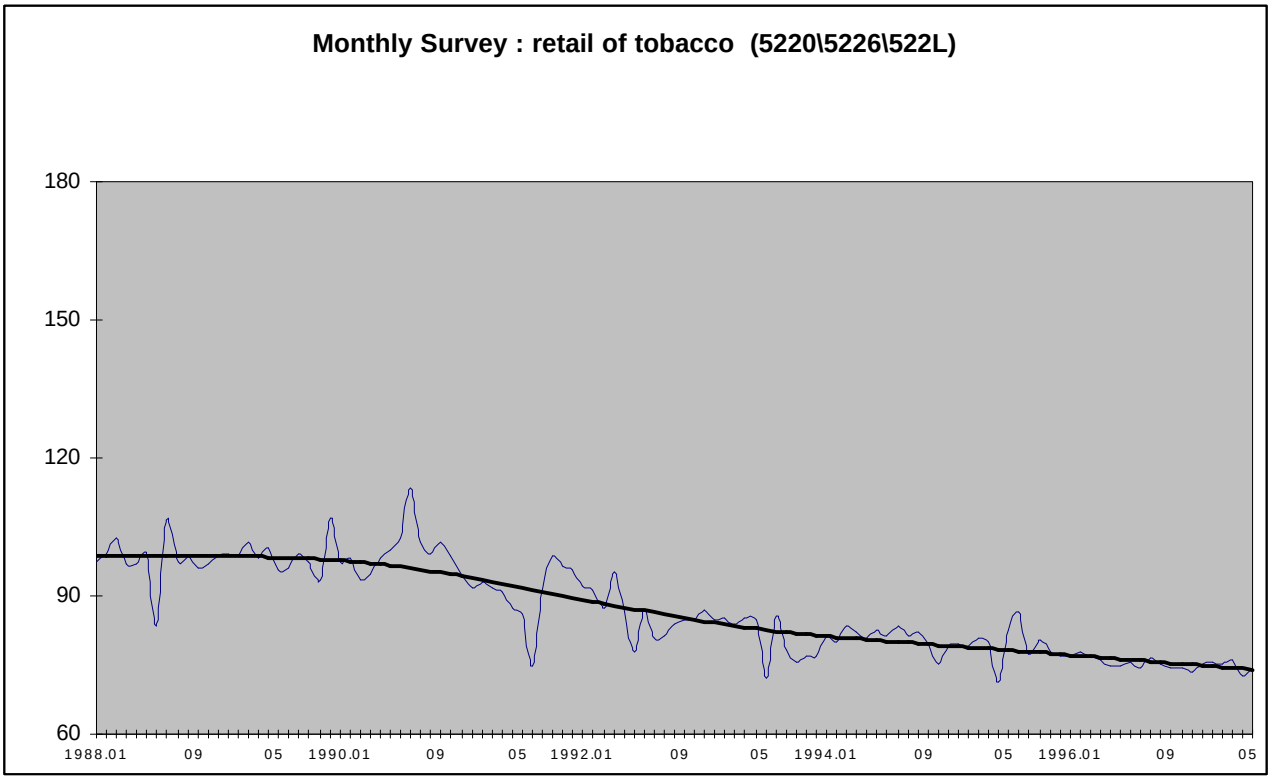

Monthly survey : retail trade of fruits and vegetables (5220\5221\522A)
140
105
70
1988.01
1989.01
1990.01
1991.01
1992.01
1993.01
1994.01
1995.01
1996.01
1997.01


VAT: retail trade of fruits and vegetables (5220\5221\522A)
140
105
70
1988.01
1989.01
1990.01
1991.01
1992.01
1993.01
1994.01
1995.01
1996.01
1997.01


Monthly Survey : retail of tobacco (5220\5226\522L)
180
150
120
90
60
1988.01
09
05
1990.01
09
05
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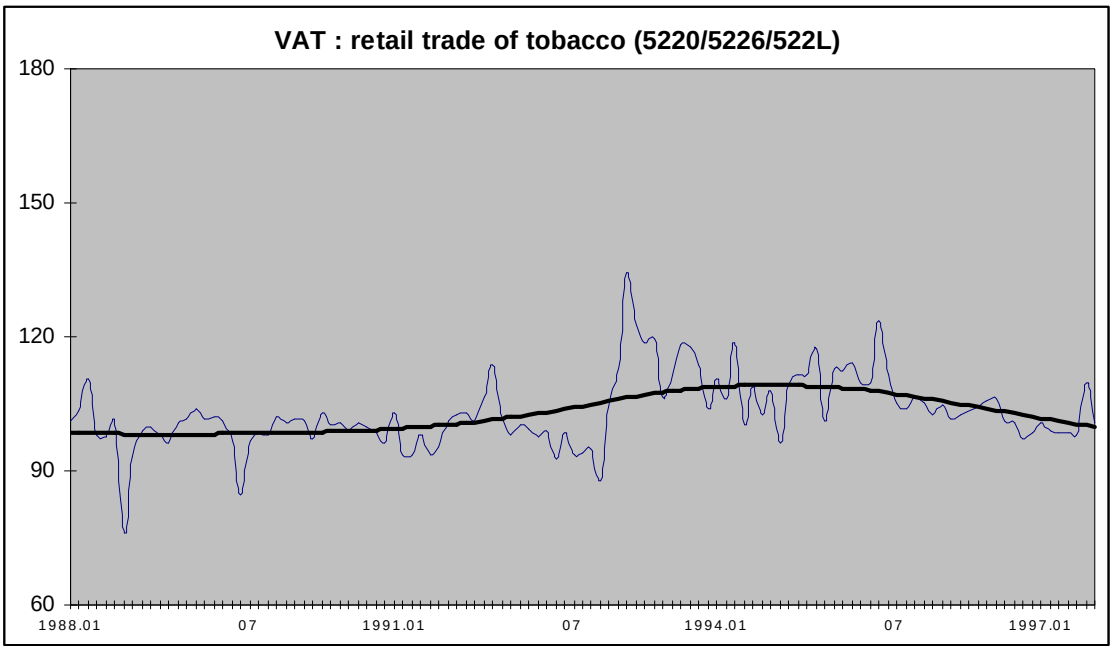
09
05
1994.01
09
05
1996.01
09
05


VAT : retail trade of tobacco (5220/5226/522L)
180
150
120
90
60
1988.01
07
1991.01
07
1994.01
07
1997.01