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**Construction and Retail Trade ISAE surveys: methodological aspects  
and cyclical features**

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# 1. Introduction<sup>1</sup>

Since the early 1990s the construction and retail trade sectors are playing an increasingly crucial role in the evolution of the Italian economy<sup>2</sup>.

Accordingly, the availability of timely information on current and expected trends in these sectors is crucial to both those operating in the sector and to the institutions in charge of shaping the economic policy. As a result, increasing attention has been focused on the statistical tools available for processing market data and measuring and forecasting economic trends. The statistician's arsenal in this context includes business tendency surveys which, albeit designed not to replace but to supplement quantitative measurements, deserve a special mention. By providing for "quick" results, these surveys allow market operators and policy-makers alike to anticipate trends well ahead of the publication of official statistics (Pinca, 1992).

Also in light of these considerations, ISAE has recently restructured the methodological framework for construction and retail trade surveys.

The innovations specifically regard the frame list, the sample design and, finally, the weighting methods for both sectors. They have all been done taking in mind the suggestions proposed within Commission's harmonised survey programme (European Commission, 2007). After the restructuring, the survey samples are derived from frames whose are suppose to register all the units of the whole relevant population. Probabilistic sample selection techniques and stratification-based sampling methods are also used for both surveys. To conclude, two-stages weighting procedures are chosen.

The aims of this work is to show the methodological and statistical aspects of the restructured ISAE surveys and, after that, to illustrate the capability of the surveys of tracking actual data. In particular, the paper focuses on the illustration of an updated version of the leading indicators for construction and retail trade sectors based on ISAE survey data<sup>3</sup>.

This paper goes as follows: section 2 illustrates the recent innovations introduced in ISAE construction and retail trade surveys; section 3 provides a description of the leading indicators constructed for the two sectors, together with an assessment of the performances as against the data series of reference, further comparing forecasting capability against the EC confidence indices.

## 2. The last updating of the ISAE construction and retail trade surveys

### 2.1 The relevant innovations in the way the surveys are conducted

For construction survey, until 1999, statistical unit was local Unit (Martelli, 1998). Subsequently, introducing ASIA archives as sample frame, (these archives provide data two years later), we chose as

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<sup>1</sup> The authors wish to thank Marco Malgarini for the useful comments and suggestions.

The views expressed in this paper are those of the authors and do not involve any responsibility of ISAE.

Although the paper reports the results of a joint research of both authors, Luciana Crosilla wrote about construction and Solange Leproux is responsible for retail trade.

<sup>2</sup> On the basis of the Italian Institute of Statistics (ISTAT), in 2006 the construction sector represents the 5.4% of the GDP and the 8.2 of the total employees. On the other hand, the retail trade sector represents the 11% of the GDP and the 12% of the total employees. Moreover, for the construction sector the volume of investments increased between 1998 and 2006 in all the UE countries (the medium growth rate is 18%). In nine UE countries (Italy is one of them), investments produced in 2006, represented the higher value in period 1998-2006 (ANCE, 2007). Therefore, the sector is one of the developing factors in the advanced economies

<sup>3</sup> The preliminary results of the study about the construction of the leadings were presented at the last CIRET Conference (Rome, September 2006). The work has been partly revised afterwards, and it has been published in ISAE Working paper series (see Crosilla, Leproux, 2007).

statistical unit the firm in place of local unit (as for other surveys carried out by ISAE, see Cesaroni and others, 2005; Malgarini and others 2005). However, by theoretic point of view, we specify that local unit is better than firm as statistical unit, because you can observe the territorial reality. Yet, on the basis of past experience, we observe that answers of local unit were the same information provided by the head office canceling the possibility to investigate territorial reality.

Moreover, it was introduced a new unit extraction criterion for the sample and new weights in the data processing procedure (see following sections).

Considering the sample innovations of the survey and the new weights introduced in the second step of the aggregation procedure, in 2006 ISAE introduced the monthly publication of data and the confidence climate calculation<sup>4</sup>.

Regarding to the retail trade survey, the current statistical and methodological structure of the survey is the result of a deep recent revision (Leproux, 2003)<sup>5</sup>. In particular, the main innovations have been: the theoretical predisposition of unitary sample design (before the restructuring, in fact, the survey featured a sampling dichotomy based on two samples: one only for the large distribution and the other for the tradition retail trade); the adoption of the retail enterprise as a statistical unit (before it was the outlet); the acquisition of the official "ASIA" archives (as it will be said subsequently), as the basis of the sample (at first, the basis was constituted by the telephone directory and the trade associations); the adoption of the new rule distinguishing between the two kind of distribution (it was previously based on the number of outlets. Now, according to the National Institute of Statistics, the classification is made on the basis of the total square-metres of the retail enterprise).

The construction of the synthetic retail trade confidence climate was made after both completion of the revision and the stability of the sample. Moreover, since October 2002, data are made public.

After that, in 2004, in order to take account of the new structure of the Italian distribution sector that emerged during the second half of the 1990s, the weighting system used to obtain the figures representing the sector as a whole was updated with the new ISTAT 2000 weights<sup>6</sup>. At that time, the series of the retail sector indicator was recalculated as from January 2000 using the new weights and constructing a new index, expressed on the basis of 2000=100<sup>7</sup>; the confidence indicator series calculated at the disaggregated level, with reference, that is to say, only to traditional retail trade and only to large distribution were also re-based on the year 2000 (ISTAT, 2003).

## 2.2 The target universe and the sample frame list

ISAE has been conducting a survey on construction sector since 1966 and that on retail trade since 1986, in the framework of an EU-wide project harmonized by the European Commission (European Commission, 2004). The surveys consist of qualitative questions on the main economic variables in both sectors<sup>8</sup>. The

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<sup>4</sup> The ISAE confidence climate is calculated, according to the EC methodology (European Commission, 1997), as a simple arithmetic mean of the seasonally adjusted balances regarding questions about assessments on order books and expectations on employment. Thus, the confidence climate series is indexed with basis 2000=100.

<sup>5</sup> See Martelli, 1998, for a description of the original survey method.

<sup>6</sup> According to ISTAT, 38,4% of overall turnover is attributed to large-distribution and the remaining 61,6% to traditional distribution.

<sup>7</sup> In order to be able to link the new confidence climate series in retail trade as a whole, available from January 2000, with the pre-existing historical series covering the period from January 1990 (first database year) to December 1999, the old index was adjusted using an appropriate coefficient. The latter was calculated as the ratio between 100 (i.e. the average value of the old index 1995=100) and the average value of the 12 old indices, base 1995, referred to year 2000.

<sup>8</sup> The survey questionnaires reflect the Commission suggestions. In particular, the construction questionnaire includes questions about assessments on current overall order books, the building activity and on main factors limiting the activity. There are also three questions about expectations on prices, employment and order books (this last question is not present in EU questionnaire). On the other hand, the retail trade questionnaire includes seven qualitative questions (with three kinds of reply), concerning: 1) assessments on the business trend, on the volume of inventories, on the

surveys are carried out on a monthly basis, throughout the whole year, on a theoretical panel of 500 and 1000 firms respectively for the construction and the retail sector. In quality surveys on simple random samples, with a confidence rate of 95%, this number of respondents (500 and 1000) guarantees estimate mistakes not exceeding 4,4% and 3%, respectively.

Currently, for construction survey, the reference universe is made up of Italian firms classified in the 45 sector of NACE (Rev.2) classification as they result in the last Italian industry and service census.

With reference to retail trade survey, instead, it is constituted from the firms classified in the NACE (Rev.2) classification no.50 and no.52, as they result in the last Italian industry and service census.

Since it's not possible to have a list (with data firms as address, name etc.) with all the firms surveyed in census, for extraction sample we use the official ASIA archives (accordingly to European Commission recommendations – EU, 2007 -), elaborated by ISTAT. ASIA is an official statistical register of active firms where we find all the identificative (name, address, telephone number, fiscal code et cet.) and structural information (number employees, NACE classification, et cet.).

Surveys are carried out with telephonic techniques, with reference to the retail trade survey (since 2005), and by mail for the construction sector.

As for this latter survey, ISAE has an archives where it finds all the information of the enterprises to which to send the questionnaire monthly. It is opportunely over dimensioned regarding the theoretical numerosity of the sample in order to assure a suitable response rate<sup>9</sup>. These archives are constantly revised on the basis of the communications of the firms and, every month, number employees is revised on the basis of the questionnaire. ISAE archives are revised every two years in order to eliminate firms that failed to answer in the last 15 months.

### 2.3 The sampling method

The ISAE construction sample has been repeatedly revised and currently is represented by a “reasoned panel”<sup>10</sup> of 500 firms – according to the indications of the European Commission - stratified into geographic regions (North West, North East, Center, South) with proportional allocation of the units in the single strata (that is, in every single stratus there is a number of firms proportional to that of the correspondent stratus in the universe – see tab. 1)<sup>11</sup>(Cochran, 1997). However, sample is not stratified according to the economic sectors: in fact, ASIA is based on the NACE rev.2 classification that is different with respect to that proposed in the EU questionnaire (residential building, non residential building, civil engineering)<sup>12</sup>.

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producer prices level; 2) three-month forecasts on the order-books, on the number of employed, on the sale prices level and, finally, on business trend.

<sup>9</sup> The survey belongs to SISTAN ( Italian National Statistical System) and, for this reason, firms can be forced by law to participate. However, ISAE prefers not to highlight this appearance searching for the willingness of enterprises to cooperate, in agreement to the advices of the OECD (OECD, 2003). Therefore, also for this reason, it's difficult to obtain a number of answers equal to number expected for the sample (currently, the response rate is about 30%).

<sup>10</sup> The feature of panel survey is in the planning of only one sample, *the original sample*, that is selected for the first survey. For the construction survey, the original sample has been revised several times but a team (about 180 – 30 of them have 100 and more employees) of faithful firms take part in survey since several years. All these firms are classified in 45.2 (building activity) and 45.3 (installation in a building) sectors of NACE rev.2.

<sup>11</sup> We are currently planning the sample stratification also for activity sectors (according to three digit NACE rev.2).

<sup>12</sup> Firms classified themselves when they compile questionnaire for the first time.

**Tab.1 Construction survey – Universe and proportional sample**

Geographic partitions	Universe		Sample		Sample fraction n/N (%)
	Absolute values	%	Absolute values	%	
North West	180381	31,5	158	31,5	0,03
North East	139053	24,3	121	24,3	0,02
Centre	115612	20,2	101	20,2	0,02
Mezzogiorno	137273	24,0	120	24,0	0,02
Total	572319	100	500	100	0,09

Source: Own calculations on Istat data

In further detail, the firm selection is carried out by a mixed technique: systematic-random extraction type with implicit stratification for small and medium firms (1-99 employees); on the other hand, given the peculiar characteristic of the sector in Italy, large firms (100 and more employees) have all been included in the sample. The selection, therefore, is not completely random: that corresponds to the requirement to follow “leader” firms (100 and more employees which represent 0,1% of total firms and 5% of total employees in the sector, see tab. 2); leader firms represent the more reliable units in a sector where the birth-mortality rate of medium and small firms is high. Moreover, this firms are more sensible to markets change and they have an economic importance more than proportional compared to their size.

**Tab.2 Construction survey – Firms distribution in the reference universe**

Size	Firms number	Employees
1-9	94.9	64.3
10-99	5.0	30.1
>=100	0.1	5.6
Total	100	100

Source: Own calculations on Istat data

The new criterion of sampling - introduced in the course of 2005 and revised in 2007 - has produced a remarkable increase in the response rate, thus assuring a more representative sample.

Concerning the retail trade survey, the sample is a theoretical panel of 1,000 respondents. The sample pattern, in particular, is complex and proportional (Cochran, 1997, *ib.*). It is stratified by: firm typology (traditional retail trade and large distribution); four geographical partitions (North-West; North-East; Centre; South); five sectors of activity (Food; Textiles and Clothing; Household Articles among which: Home Appliances and Other Articles; Means of Transportation; Other Products never surveyed before) (Tab.3). In each sample strata, the number of respondents is proportional both to the reference population and to the weight of the strata in terms of turnover.

**Tab.3 ISAE Retail trade survey : Traditional Retail and Large Distribution. Sample 2000.**  
(Absolute values)

	Italy	North West	North East	North	Centre	South
<b>Food</b>	297	63	84	147	61	89
Traditional retail trade	211	45	59	104	44	64
Large distribution	86	19	25	44	17	25
<b>Textiles and Clothing</b>	159	34	45	78	33	48
Traditional retail trade	140	30	39	69	29	42
Large distribution	19	4	6	10	4	6
<b>Household Articles</b>	158	33	44	78	32	47
Traditional retail trade	133	28	37	65	28	40
Large distribution	25	5	7	13	5	7
<b>-Home appliances</b>	37	8	10	18	8	11
Traditional retail trade	30	6	8	15	6	9
Large distribution	7	1	2	3	1	2
<b>-Other articles</b>	121	26	34	60	25	36
Traditional retail trade	103	22	29	50	21	31
Large distribution	18	4	5	9	4	5
<b>Means of transportation</b>	181	39	52	90	37	54
Traditional retail trade	114	24	32	56	24	35
Large distribution	66	15	20	34	13	19
<b>Other products</b>	205	44	58	101	42	62
Traditional retail trade	188	40	53	92	39	57
Large distribution	18	4	5	9	3	5
<b>Total</b>	1000	213	283	494	205	300
Traditional retail trade	786	166	220	386	164	238
Large distribution	214	47	63	110	42	62

Source: Own calculations on Istat data

## 2.4. The weighting method

ISAE adopts a two stage data processing procedure. The first stage consists in weighting the answers of each firm with “internal” weights, that concurs to reduce the distortions deriving from the different degree of firm influence on the total results (OECD, 2003, EU, 2007). In this step, percentages of each answer relevant to the k activity sector ( $X_k$ ), are calculated using firm employees as weights (“internal” weight). In other words, in the first stage of the process, the aggregated percentages of answers are obtained as a weighted average of the firm-specific answers, the weights being the number of the firm employees,  $Y_i$ :

$$X_k = \left( \sum_{i=1}^n Y_i * X_i \right) / \sum_{i=1}^n Y_i \quad (1)$$

where  $i$  indicates the single firm and  $n$  is the number of enterprises in the  $k$  activity sector.

In the second step, in order to obtain the results concerning to the overall sector, the data are aggregated using “external” specific weights. In particular, the answers of each sector (typology, in the case of retail trade)<sup>13</sup> are combined using the corresponding turnover for the retail trade, and employees of the reference universe for the construction sector.

To conclude,

$$X = \left( \sum_{k=1}^l W_k * X_k \right) / \sum_{k=1}^l W_k \quad (2)$$

where  $W_k$  is the specific weight for the  $k$  sector (or typology) and  $l$  is the total of sectors (or typologies).

In this second step, for construction a new weight system has been introduced since 2006. In particular, the results for total sector are a weighted average of every single sector (residential and non residential building, civil engineering), weighted on the basis of the investments estimated for 2004 (ANCE, 2005). For the new weights used, the series of balances for the total sector have been reconstructed beginning from 1995.

Finally, for both sectors, the confidence climate is elaborated on a monthly basis using seasonally adjusted balances (Gomez, Maravall, 2000) concerning the following variables: assessments on order books and expectations on employment for construction (see also footnote no.4); assessments on business trend, three-month forecasts on business trend, assessments on inventories (this variable is always taken with the opposite sign) for retail.

### 3. Leading indicators for the construction and retail trade Italian sectors<sup>14</sup>

In a previous work (Crosilla, Leproux, 2007), leading indicators for construction and retail sectors are obtained as simple average of the balances of assessments on activity and the expectations on order books<sup>15</sup>, the former, and expectations on business trend and on order books, the latter. Value added (ISTAT, 2005) of construction Italian sector and households’ consumption were chosen as reference series.

This section aims to assess the forecasting capabilities of the two leading indicators, taking under consideration the period from the first quarter 1995 to the second of 2007 for the construction sector, and the period from the first quarter 1990 to the second of 2007 for the retail trade.

In particular, following Harding e Pagan (Harding, Pagan, 2002), the leading indicator for construction value added (LVA) (see tab. 4 and fig. 1) is characterized by three complete cycles, while the reference series has two cycles; moreover only six turning points are present for the value added while LVA is characterized by eight points. According to the turning points alignment, the indicator have not global leading ability. However, we marked that the indicator seems to have a good leading ability in the first years of the sample while it seems to have a lagging feature in the last years.

For households’ expenditures (see tab 4 again and fig.2), the leading indicator seems to lead, on the average, the reference series of two quarter. The leading is even better for downturns (-2,5 on average).

<sup>13</sup> The construction sectors are: residential building, non residential building and civil engineering; the retail trade typologies are: traditional retail trade and large distribution.

<sup>14</sup> For the complete methodology used to elaborate the two leading indicators, see section 2 in Crosilla, Leproux (2007).

<sup>15</sup> In a preliminary work presented at 28<sup>th</sup> CIRET conference (Rome, September 2006), we tried to construct a leading indicator also for the investments combining the series of assessments on activity and expectations on employment. The indicator exhibits sufficient leading capability at turning points when subjected to the Bry-Boschan routine but econometric tests do not highlight satisfactory forecasting capabilities.

Table 5 then provides cross correlations between the cyclical components (extracted with Hodrick-Prescott filter - Hodrick, Prescott, 1980) of the two leading indicators and the reference series. The same empirical relationship has been also studied between the traditional EU-harmonised confidence climate and the quantitative series.

For the construction sector, the cross correlation between the new leading indicator and the reference series peaks at lead -2 (0,54) while the contemporaneous correlation is equal to 0,23. For retail trade, the new indicator shows a good contemporaneous coefficient (0,52) and a quite high maximum correlation one quarter in advance (0,60).

**Tab.4 Leading indicators based on ISAE construction and retail trade surveys**

	Construction		Retail Trade	
	Value added	Leading Indicator	Households' expenditure	Leading Indicator
Number of cycles	2	3	3	4
Number of turning points	6	8	8	10
Number of shared turning points	\	6	\	8
False signals	\	2	\	2
Missing	\	\	\	0
		Turning Points		
Through	1995q4	1995q3	\	1991q1
Peak	1997q1	1997q1	1992q2	1992q1
Through	1997q4	1998q2	1993q2	1993q1
Peak	1998q2	1998q4	1996q1	1995q3
Through	2001q4	2002q3	1996q3	1996q3
Peak	2002q2	2003q1	2000q4	2000q2
Through	\	2004q2	2002q2	2001q4
Peak	\	2006q2	\	\
Through			\	\
Peak			2004q1	2002q4
Through			2004q3	2004q2
Peak			\	2006q4
		Mean lead(-)/lag(+) at turning points (in quarters)		
Total		1,5		-2,0
Downturns		1,3		-2,5
Upturns		1,6		-1,0

Period: 1995-1, 2007-2 for construction; 1990-1, 2007-2 for retail trade

Source: Own calculations on ISAE and ISTAT data

Both leading indicators show a stronger correlation with the reference series with respect to the more traditional confidence climate.

Table 5 also provides a first analysis of in sample and out of sample properties of the leading indicators, again compared with those of the two confidence climates. More specifically we perform a simple Granger causality test (Laszlo, 2004) estimating the following equation:

$$\Delta \log y_t = \alpha + \sum_{i=1}^1 \beta_i \Delta \log y_{t-i} + \sum_{i=1}^1 \gamma_i VI_{t-i} + \varepsilon_t \quad (3)$$

and testing if  $\gamma_i$  are equal to 0 for every  $i$ . In (3)  $i$  is the number of lags,  $y_t$  is the reference variable in the first differences of the logarithms in order to take into account possible non stationary<sup>16</sup>,  $\alpha$ , a constant,  $\beta_i$  and  $\gamma_i$ , respectively, regression coefficients for the considered past values of the dependent and independent variable VI (the ISAE leading), and lastly,  $\varepsilon_t$ , the error.

Both leadings “granger-cause” reference series (see tab.5).

<sup>16</sup> To this end, the series underwent a preliminary testing for the presence of unit roots (namely, the test confirming that the time series data are not stationary), using the Augmented Dickey-Fuller (ADF) test.

Out of sample properties have then been analysed estimating:

$$\Delta \log y_t = \alpha + \sum_{i=1}^1 \beta_i \Delta \log y_{t-i} + \sum_{i=0}^1 \gamma_i VI_{t-i} + \varepsilon_t \quad (4)$$

i.e. including in (3) also the contemporaneous value of leading indicators.

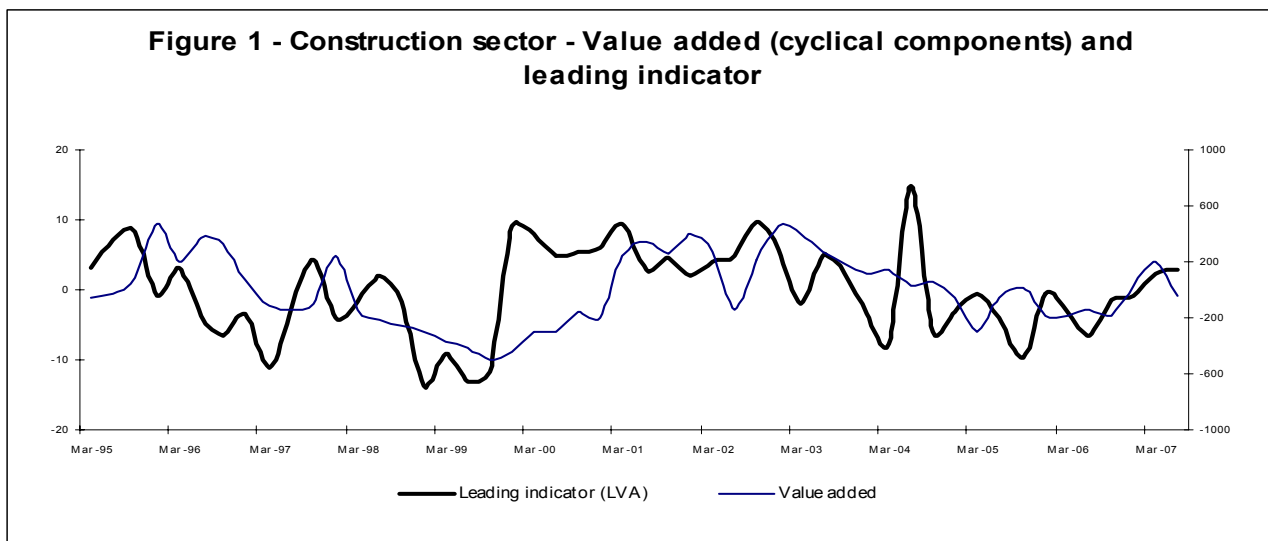
**Tab.5 Leading indicators and EU confidence climate: cross-correlation, in sample and out of sample properties**

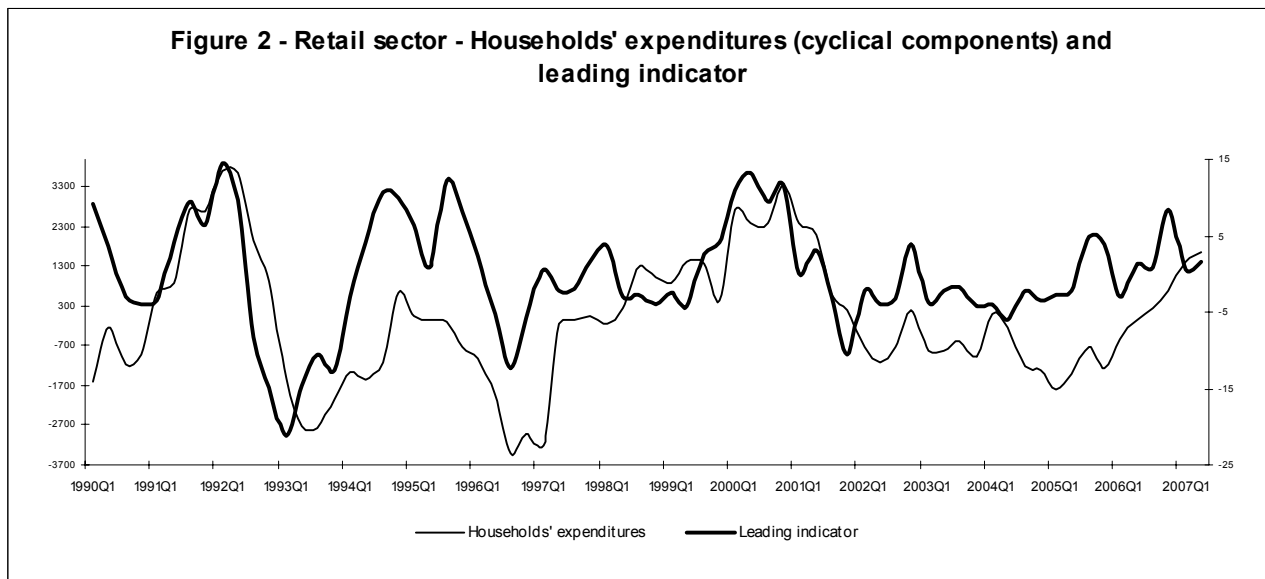
		Construction		Retail Trade	
		Leading indicator	EC confidence climate index	Leading indicator	EC confidence climate index
Cross-correlation function	$\rho(0)$	0,23	0,18	0,52	0,05
	$\rho$ max (lead(-)/lag(+))	0,54 (-2)	0,55 (-7)	0,60(-1)	0,52(-1)
Granger causality test		3,33* (0,02021)	1,38 (0,25893)	4,45** (0,003)	0,97 (0,432)
Rmse		0,00998	0,01247	0,00397	0,00459
Mae		0,00877	0,00977	0,00328	0,00320
Theil U	Total	0,54440	0,54735	0,54120	0,64399
	Bias	0,01344	0,39225	0,07013	0,10787
	Var.	0,03519	0,15664	0,01543	0,01020
	Cov.	0,95136	0,45110	0,91445	0,88193

\* Significant at 5%, \*\* Significant at 1%

Period: 1995-1, 2007-2 for construction; 1990-1, 2007-2 for retail trade

Source: Own calculations on EC and ISTAT data





In estimating (4), we considered up to 4 lags of the independent variable for construction and up to 8 lags for retail trade<sup>17</sup>. The estimated values of the dependent variable are obtained using the "static" (one step) ahead forecast.

Construction leading indicator has an acceptable forecast out-of-sample ability (Theil inequality coefficient is 0,54 with bias and covariance equal, respectively, to 0,013 and 0,95)<sup>18</sup>.

As for retail trade, the leading indicator really seems to possess acceptable out of sample forecasting capabilities; the value of the Theil coefficient is 0.54 with a bias and covariance of 0.07 and 0.91 respectively (tab. 5, again)<sup>19</sup>.

To conclude, encouraging results were however obtained by comparing the in-sample and out of sample forecasting capabilities of the indicators with those of the EC confidence climates monthly released for Italian construction and retail trade sectors (see again tab.5). This was done using, of course, the value added and the households' expenditures as reference series for construction and retail , respectively.

For construction, we observe that cross-correlation between the indicator and the value added peaks at lead - 2 while that between EC confidence climate and the reference series peaks at lead -7 but the function value is similar to that of leading. Moreover, EC confidence climate does not Granger-cause the value added. Comparing the regression model (see tab.5, again) including, alternatively, the past dynamics of the LVA indicator and those of the confidence climate, we notice that RMSE and MAE are definitely higher for the model including the confidence climate. The forecasted values by the model including the confidence index, have a slightly higher Theil coefficient but they are more biased than the model including the leading indicator (the Theil coefficient value is 0,54 for EC climate while it is 0,54 for the leading indicator). In this case, therefore, the leading performance of the indicator is decidedly better than that of the confidence climate. All in all, the leading indicator seems to have better forecasting capabilities (two quarter in advance) than the EC confidence climate.

<sup>17</sup> As for the construction data, four lags have been enough to obtain a good estimation of the equation. Concerning retail trade, the results obtained by inserting up to only four lags were not considered satisfactory. They didn't seem sufficient to eliminate autocorrelation in the equation.

<sup>18</sup> The equation (4) was estimated, in particular, up to the last quarter of 2003, leaving, as a forecast window, the period between the first quarter of 2004 and the second quarter of 2007.

<sup>19</sup> In this case, the equation (4) was estimated up to the second quarter of 2003, leaving, as a forecast window the period from the third quarter of 2003 to the second quarter of 2007.

Now, looking at results concerning to retail trade, at the level of significance of 1%, the Granger test leads to the acceptance of the null hypothesis of non-causality between both the ISAE and EC confidence climate and the reference series<sup>20</sup>. Quite the reserve, that hypothesis must be refused if the leading indicator is considered. To conclude, the indicator seems to possess better (one step) out of sample forecasting capabilities than the EU indicator: indeed, the RMSE, the MAE and, finally, the Theil Inequality Coefficient values are lower.

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<sup>20</sup> With reference to a significance level of 5%, the value of the F statistic of the ISAE confidence climate falls within the area of null hypothesis refusal, although it is close to the threshold limit of acceptance of this hypothesis.

## References

- ANCE (2005): “Osservatorio congiunturale sull’industria delle costruzioni”, a cura della Direzione affari Economici e Centro Studi, maggio
- ANCE (2007): “Osservatorio congiunturale sull’industria delle costruzioni”, a cura della Direzione affari Economici e Centro Studi, maggio
- Cesaroni, T., Malgarini, M., Rocchetti, G, (2005): “L’inchiesta ISAE sugli investimenti delle imprese manifatturiere ed estrattive: aspetti metodologici e risultati”, Isae working paper series, n. 50
- Crosilla, L., Leproux, S., (2007): “Leading indicators on construction and retail trade sectors based on ISAE survey data”, Isae working paper series, n.77
- Cochran, W.G., (1997), “Sampling techniques”, 3<sup>rd</sup> edition, John Wiley and sons, New York
- European Commission (1997) : “The joint harmonized EU programme of business and consumer surveys” in European Economy, no.6, Directorate-General for economic and financial affairs, Brussels
- European Commission (2004): “The joint Harmonised EU Programme of business and Consumer Surveys” User guide 2004, Directorate General Economic and Financial Affairs , Economic studies and research Business surveys, Brussels
- European Commission (2007): “The joint Harmonised EU Programme of business and Consumer Surveys” Special Report n.5/2006 Directorate General Economic and Financial Affairs , Economic studies and research Business surveys, Brussels
- Gomez, V., Maravall, A. (2000) : “Seasonal adjustment interface demetra for Tramo/Seats and X-12-ARIMA”, User manual vers. 1.4, Eurostat
- Harding, D., Pagan, A., (2002): “Dissecting the cycle: a methodological investigation”, in Journal of Monetary Economics, vol.49, n.2
- Hodrick, R.J., Prescott, E.C. (1980): “Postwar U.S. business cycles: an empirical investigation”, Carnegie-Mellon University, Discussion paper, n.451
- ISTAT (2003): “Indice del valore delle vendite del commercio fisso al dettaglio”, December
- ISTAT (2005): “Principali innovazioni della revisione generale dei conti nazionali-anno base 2000”
- Laszlo, K., (2004): “Unit root, cointegration and Granger causalità test results for export and growth in OECD countries”, International Journal of applied econometrics and quantitative studies, vol. 1-2
- Leproux, S., (2003): “L’inchiesta ISEA-UE presso le imprese del commercio al minuto tradizionale e della grande distribuzione: la revisione dell’impianto metodologico”, Isae working paper series, n.32
- Malgarini, M., Margani, P., Martelli, B.M., (2005) : “Re-engineering the ISAE manufacturing survey”, Isae working paper series n.47
- Martelli, B. M. (1998): “Le inchieste congiunturali dell’ISCO: aspetti metodologici”, in Rassegna di lavori dell’ISCO, n.3
- OECD (2003) : “Business tendency surveys – a handbook”
- Pinca, F. (1992) : “Le indagini congiunturali come strumento per l’analisi della congiuntura” in Rassegna di lavori dell’ISCO, anno X, n.1, 1993