**45-day flash estimates of a PEEI: the Italian job vacancy rate – methods, revisions, cyclical properties**

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**Abstract**

*The EU regulation on quarterly job vacancy statistics requires data transmission within 70 and 45 days after the end of the reference quarter. The published indicator is the job vacancy rate, that is the ratio between the number of vacant posts and the sum of vacant and occupied posts, which is included among the Euro Principal European Economic Indicators (PEEIs) and is considered a potential leading indicator of the business cycle. The Italian job vacancy data are based on two direct business surveys and an auxiliary administrative based source (for editing and imputation and calibration). The procedure used to produce the data for the 70 day deadline makes full use of the reference quarter data from all three sources. However, for the 45 day deadline fewer data are available and as a consequence a different procedure needed to be developed and implemented. In particular, administrative based data for previous quarters are used, as well as more limited sets of respondents to the two direct surveys. The results have proven so far very satisfactory. The revisions between job vacancy rate estimates for the 45 and 70 day deadlines are often zero, especially at the higher aggregation levels. This happens also if the rate numerator and denominator change significantly between the two estimates, due to the different sets of direct survey respondents and the different populations on which the calibration constraints are based. Furthermore, the flash estimates job vacancy rate generally show good cyclical properties. The flash estimates quality, however, can be negatively affected by intense and prolonged downturns and upturns, when the impact of the use of calibration constraints based on previous quarters rather than the reference one can be more relevant. Improvements in the procedure to account for this limit could be studied in the future.*

**Keywords:** flash estimates, vacancy rate, leading indicator, business survey, administrative data

1. **Introduction**

The production of quarterly job vacancy statistics is required by the Regulation No 453/2008 of the European Parliament and the Council (and implementing Regulations No 1062/2008 and No 19/2009).

Job vacancies measure the staff search/selection activities carried out by enterprises for recruitment purposes, which are still ongoing on the reference date. These search activities may concern the replacement of an employee in an existing position or the creation of an additional job position. The position to fill can already be available on the reference date, or become available in the near future. A selection/search activity means that the enterprise has undertaken concrete actions to find a suitable candidate to recruit (for example, giving notification to public employment agencies, contacting private employment agencies, posting the job offer in the media or on a public communication board, directly contacting, interviewing or selecting candidates, contacting employees or other acquaintances to ask them for help in finding a suitable candidate; use of internships for the selection of future employees). It is not sufficient for the enterprise to express the intention to undertake these actions in the future.

The job vacancy rate measures for how many jobs these search/selection activities are in progress out of every 100 positions which are either already occupied or for which a recruitment process is taking place. The Italian job vacancy rate covers enterprises in industry and services (Nace Rev. 2 sections B to S) with at least 10 employees. It is available only for the entire national territory and at the level of the Nace Rev. 2 economic activity sections and it measures vacancies which were open on the last day of the quarter.

The job vacancy rate is one of the PEEIs on the labour market and is considered a possible leading indicator on it. In fact, because job vacancies measure employment intentions that have materialized in candidates’ searches, they can give “early warnings” on the dynamics of jobs in the near future.

To be useful for this purpose, the data on the vacancy rate are disseminated with high timeliness: by 45 and 70 days after the end of the reference quarter, in the first case as flash estimates, in compliance with the relevant EU Regulations.

In this paper the methodology used in ISTAT for the production of the flash estimates and the difference with the procedure and results for the 70-day estimates are described and analysed.

**2. The procedure for the Italian job vacancies quarterly estimates and difference between flash and final estimation**

The job vacancy rate statistics are produced integrating the microdata of two ISTAT surveys and using those of a third one for editing and imputation and calibration (see Baldi et al., 2011, and Bellisai et al., 2013). The three surveys are:

* VELA: a quarterly sample survey (of around 26,000 enterprises) that collects data on jobs, vacancies and hours worked on the enterprises with a number of employees between 10 and 500 in sections B to S of Nace Rev. 2;
* GI: a monthly census survey (of around 1,500 enterprises) that collects data on jobs, vacancies (only quarterly), hours worked, wages and labour costs on the enterprises with at least 500 employees in sections B to S of Nace Rev. 2;
* OROS: an administrative based quarterly survey that collects information on jobs, wages and labours costs on all active enterprises with employees (around 1.4 millions) in sections B to S of Nace Rev. 2.

As indicated above, the OROS microdata are used for editing and imputation (of VELA jobs) and to calculate the calibrations constraints (Deville and Särndal, 1992, and Särndal, 2007) used to produce the aggregate series for jobs and vacancies.

The differences in the production processes for the estimates produced for the 45 and 70 day (in the following, called final estimates) Regulation deadlines are due to the different data availability and the need to contain the flash estimates production process duration.

The OROS microdata for a given quarter become available for the production of job vacancy statistics around 50-53 days after the end of the reference quarter. Therefore, they can be used in the production of the final estimates, but not for the flash ones. This circumstance is at the basis of the main difference between the production processes for flash and final estimates.

To solve this problem, the flash estimates calibration constraints are calculated on the OROS data referring to the same quarter of the previous year (t-4). These data are preferred to the latest ones available (those for the previous quarter, t-1) due to the seasonal effects that characterize jobs dynamics.

Furthermore, at the time of the production of job vacancy flash estimates, GI data for the third month of the reference quarter have not yet been edited or imputed. Hence, jobs at the end of the third month of the quarter are estimated through those at the end of the second month, for each GI enterprise.

Another source of difference between flash and final estimates are the smaller sets of VELA and GI respondents which are available for the first estimation process: in fact, they include about 87% of those available for final estimates.

To maximise the number of VELA and GI responses that can be used in the flash estimation procedures by reducing the time needed for data production, fewer interactive checks than the final estimation ones have been included in them.

**3. Differences between flash and final estimates**

In this section we compare flash and final estimates, focusing on revisions, and we show some evidence on the indicators cyclical properties.

Table 1 shows the differences between flash and final estimates, over a period of sixteen quarters from the first quarter 2014 to the fourth quarter 2017, for the job vacancies rate and its components, that is the number of vacant posts and the number of occupied posts (number of jobs).

**Table 1. Job vacancy rate, vacancies, jobs and calibration populations in industry and services, absolute and percentage differences between flash and final estimates Q1 2014 – Q4 2017**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **year** | **quarter** | **Industry and services** | | | |
| **vacancy  rate (absolute)** | **vacancies (%)** | **jobs (%)** | **calibration populations (%)** |
| **2014** | **1** | 0.0 | -1.9 | 0.8 | -1.48 |
| **2** | 0.0 | -6.8 | -0.6 | -1.89 |
| **3** | 0.0 | 1.7 | 0.3 | -2.14 |
| **4** | 0.0 | -10.0 | 0.4 | -3.00 |
| **2015** | **1** | 0.0 | -9.5 | -0.6 | -2.38 |
| **2** | 0.0 | -5.9 | -1.7 | -3.29 |
| **3** | 0.0 | -3.2 | -0.5 | -4.35 |
| **4** | 0.0 | -9.5 | -1.1 | -5.21 |
| **2016** | **1** | 0.0 | -7.8 | -2.5 | -8.63 |
| **2** | -0.1 | -13.1 | -0.9 | -7.58 |
| **3** | 0.0 | -8.6 | -1.6 | -7.88 |
| **4** | 0.0 | -10.8 | -2.1 | -7.87 |
| **2017** | **1** | 0.0 | -1.8 | -0.7 | -6.20 |
| **2** | -0.1 | -6.3 | -0.8 | -6.38 |
| **3** | 0.0 | -3.0 | -1.8 | -7.65 |
| **4** | 0.0 | -10.0 | -1.6 | -6.38 |

Source: ISTAT, VELA, OROS and GI

The revisions between job vacancy rate estimates for the 45 and 70 day deadlines for the total of the covered population are zero over all the considered quarters, with the only two exceptions, when an underestimation of 0.1 percentage points is observed. When industry and services are considered separately, revisions are more frequent but their level still does not exceed 0.1 percentage points.

The percentage differences between the number of jobs in the two estimates are well explained by those observed in the populations on which calibration constraints are based. As described in Section 2, in the flash estimation process a population which refers to the same quarter of the previous year is used, while in the final process a calibration population for the same quarter as the processed data is employed. For the entire considered population and for the industry and services sectors separately a quite high positive correlation, reaching around 80%, between the percentage differences in the number of jobs estimated in the flash and final processes and in the known totals used for calibration in the two processes can be observed.

However, in the considered period, the larger changes between known totals referring to (t-4) and t do not cause relevant revisions between flash and final job vacancy rate estimates, even if they are associated with notable differences in the two estimates of the rate components.

Moreover, the revisions of the job vacancy rate flash estimate depend on the smaller sets of respondents on which the flash estimates are based with respect to the final ones.

The results obtained so far are very satisfactory in terms of both revisions and cyclical properties of the job vacancy rate flash estimates.

As already mentioned, the job vacancy rate provides interesting information on the economic cycle. This indicator, measuring the share of all employee jobs, occupied and vacant, for which a personnel search is in progress, is potentially able to anticipate with good approximation the labour market trends – its increase can signal an expansion in employment and a reduction in unemployment. In the following, these relations are explored considering seasonally adjusted data and, for the job vacancy rate, the final estimates. In fact, a seasonally adjusted series of flash estimates does not exist, because each quarter flash estimates are added to the series of the latest available estimates for the previous quarters, that is to the final estimates series up until the previous quarter. The relationship between the job vacancy rate and the unemployment rate is evident in Figure 1, although the vacancy rate considers just a portion of all the jobs which could be available for the unemployed (the indicator does not include either enterprises with less than 10 employees, the public and agricultural sectors, or the self-employed).

**Figure 1.Final job vacancy rate (right scale) and unemployment rate (left scale), seasonally adjusted data Q1 2010-Q4 2017**



Source: ISTAT VELA and Labour Force Survey

Both indicators signal the beginning of a period of economic contraction from the third quarter 2011. The following phase of expansion is evidenced by the vacancy rate from the fourth quarter 2013. A permanent reduction of the unemployment rate could be observed from the first quarter of 2015 only. The early positive sign of the vacancy rate in comparison to the unemployment rate is a recurrent and expected phenomenon. Indeed searching for personnel by enterprises takes place before hiring personnel, and only the latter contributes to reduce the unemployment rate. However, in this case the length of the time span between the cyclical inversion of the two indicators is also affected by the high decrease in inactivity and may also be a sign of a weaker matching between the characteristics of workers searched for by enterprises and available among the unemployed. This worsening event usually follows periods of economic crisis, especially when intense and long-lasting. However, the short-term analysis of the economic context and the persisting positive trend in the vacancy rate seem to prefigure a further reduction in unemployment.

Furthermore, a joined reading of the vacancy rate and the number of jobs in all enterprises with employees derived from an administrative based survey (on jobs, wages and salaries and social contributions) is provided below in Figure 2.

**Figure 2. Final job vacancy rate (right scale) and number of jobs (left scale) in industry and services, seasonally adjusted data Q1 2010-Q4 2017**



Source: ISTAT, VELA, OROS and GI

These two indicators are strongly positively related and the vacancy rate enables to nticipate the jobs cyclical dynamics with a good approximation. As the figure shows, for the total of industry and services vacancies anticipate the jobs upturn by around five quarters: the vacancy rate increases from the third quarter 2013 while the number of jobs from the first quarter 2015. There is also an anticipation of the jobs downturn, even if it is shorter than that of the job upturn: in this case, vacancies start to decrease in the second quarter 2011, three quarters before jobs. For the two main sectors separately considered, the upturn anticipation is very clear.

Even if a series of seasonally adjusted flash estimates does not exist, their good cyclical properties can be derived from those of the final estimates described above and the fact that also the differences between seasonally adjusted flash and final estimates for a given quarter are often zero, and in the considered period they exceed 0.1 percentage points only in two cases (see Table 2).

**Table 2. Seasonally adjusted job vacancy rate, absolute differences between flash and final estimates Q1 2014 – Q4 2017**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Year** | **Quarter** | ***Industry and services*** | ***Industry*** | ***Services*** |
| 2014 | I | 0.0 | 0.0 | 0.0 |
| II | 0.0 | -0.1 | 0.0 |
| III | 0.0 | 0.0 | 0.0 |
| IV | 0.0 | 0.0 | -0.1 |
| 2015 | I | 0.0 | -0.1 | 0.0 |
| II | -0.1 | -0.1 | -0.1 |
| III | 0.0 | -0.1 | 0.0 |
| IV | -0.1 | 0.0 | 0.0 |
| 2016 | I | 0.0 | 0.0 | 0.0 |
| II | -0.2 | -0.2 | -0.1 |
| III | 0.0 | -0.1 | -0.1 |
| IV | -0.1 | 0.0 | -0.1 |
| 2017 | I | 0.0 | 0.0 | 0.0 |
| II | 0.0 | -0.1 | 0.0 |
| III | 0.0 | -0.1 | 0.0 |
| IV | 0.0 | -0.1 | -0.1 |

Source: ISTAT, VELA, OROS and GI

**4. Concluding remarks**

The production of quarterly job vacancy statistics, which leads to the dissemination of one of the PEEIs on the labour market, the job vacancy rate, is based on a EU Regulation requiring data transmission to EUROSTAT by 70 and 45 days after the end of the reference quarter.

The Italian flash estimates, that is those produced for the first deadline, are based on a production process that differs from the one used for the final estimation in particular because of the different sets of available data, both on the target variables and for calibration.

These differences, however, do not produce substantial revisions between flash and final job vacancy rate estimates. As a consequence, not only the final estimates, but also the flash ones appear to show a good capability to describe and anticipate labour market dynamics.

**5. References**

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