COVERAGE EXTENSION TO THE MICRO-ENTERPRISES FOR THE ISTAT QUARTERLY INDICATORS ON JOB VACANCIES AND HOURS WORKED

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1. Introduction

From the first quarter of 2016, the Istat indicators on job vacancies and hours worked are available to all companies with employees, and not only to those with at least ten employees. New indicators have been disseminated in raw form, starting from June 2019. Seasonal adjustments were carried out later, since they required historical series adequately long to take into account the seasonal effects. They have been released for the first time in February 2020.

The coverage extension fills an important information gap and is coherent with the requests of the specific European Regulations (Reg. CE n. 453/2008 and implementing regulations, for job vacancies, and EC Reg. N. 1165/98 and subsequent modifications for the hours worked).

2. Survey and target variables

To produce these indicators, data on the target variables collected by two surveys are used together with those on jobs of an auxiliary administrative source (OROS) which are used for editing, imputation and calibration (see Chianella *et al.,* 2018; Baldi *et al.*, 2011 and Bellisai *et al.*, 2013). The first survey is the Istat quarterly survey on job vacancies and hours worked (VELA), based on a stratified random sample of about 26,000 enterprises with less than 500 employees in NACE Rev. 2 sections B to S. The second survey is the Istat monthly survey on employment, hours worked, wages and labour costs in large enterprises (GI), which is a census survey of around 1,400 enterprises with at least 500 employees in sections B to S.

The job vacancy rate is obtained as a percentage ratio between the number of job vacancies and the total of job positions, the latter calculated as the sum of the job vacancies and jobs in the last reference quarter day. Therefore, the indicator represents the part of the job requirement that is not satisfied, quantifying the share

of jobs for which companies are looking for suitable workers. A direct analogy follows with the unemployment rate, which represents the part of the unused offer, quantifying the portion of labor force seeking employment.

The indices of the number of hours worked and hours worked per capita are on a fixed-based, in order to measure the quarterly changes. The indices for each sector are obtained as a ratio between the value of the indicator in the reference quarter and the average value of the base year (2015). The number of hours worked is the sum of the hours worked by employees (ordinary and extraordinary). The hours worked per capita are obtained by dividing the total hours worked for the average number of employee positions occupied in the quarter.

3. A look at the world of micro enterprises: percentage composition of the target variables by dimensional class (according to the number of employees) and economic activity

In terms of size, in 2019 the companies with less than 10 employees represent around 85% of companies operating in the B-S economic activity sectors, excluding section O. The description of the analyzed economic activity sections, according to the NACE Rev.2 Classification is shown in Table 1.

The percentage composition of jobs, job vacancies and hours worked by section of NACE Rev. 2 classification and dimensional class (number of employees), compared to the totals in companies with employees in all sectors (B-S) is shown in Table 2.

Data in Table 2 highlight the relevance of the extension of the coverage of the indicators to business with less than 10 employees.

In addition to the percentages shown in Table 2 (computed with respect to the totals in companies with employees in all sectors B-S), this paragraph also provides some percentages of the composition with respect to the total in each sector separately.

Jobs, in 2019, within businesses with less than 10 employees accounted for 29.1% of the total calculated on all industrial and service companies (B-S). Compared to the total jobs in each sector separately, jobs in the company with less than 10 employees represent 23.3% in industry (B-F) and 32.3% in the services (G-S).

Table 1 – *NACE Rev. 2 Classification: Description at section level*

Sections	Description
B-F	**Industry**
B-E	**Industry excluding construction**
B	Mining and quarrying
C	Manufacturing
D	Electricity, gas, steam and air conditioning supply
E	Water supply, sewerage, waste management and remediation activities
F	Construction
G-S	**Services (excluding section O)**
G-N	**Market services**
G	Wholesale and retail trade; repair of motor vehicles and motorcycles
H	Transportation and storage
I	Accommodation and food service activities
J	Information and communication
K	Financial and insurance activities
L	Real estate activities
M	Professional, scientific and technical activities
N	Administrative and support service activities
P	Education
Q	Human health and social work activities
R	Arts, entertainment and recreation
S	Other service activities
B-N	**Industry and market services**
B-S	**Industry and services (exluding section O)**

Source:Eurostat

The weight of job vacancies in companies under 10 employees in the same year was greater. Job vacancies in company with less than 10 employees accounted for 42.0% in B-S, ranging from 39.0% in the industry sector (B-F) to 43.4% in the services sector (G-S). The weight of job vacancies in companies under 10 employees is particularly high in other services activities (section S), in Accommodation and food service activities (section I) and in the Construction sector (section F). In fact, in these sections, job vacancies in companies under 10 employees, represent respectively 77.5%, 64.3% and 60.4% of the total job vacancies within each sector, separately.

The weight of hours worked in companies with less than 10 employees (26.5% of the total companies in B-S) and their percentage distribution between sections of economic activity is very similar to that of jobs (see Table 2). For both variables, the weight in the companies with a size of less than 10 employees, is very high within section S (63.9% for jobs and 62.7% for hours worked), with respect to the total hours worked within the sections. Within the industrials sector (B-F) the weight of hours worked in companies with less of 10 employees was 21.5% while within the services sector (G-S) it was equal to 29.6%.

Table 2 – *Structure of jobs, job vacancies, hours worked by section of NACE Rev. 2 classification and dimensional class, compared to the total business (1+) in Industry and Services (B-S). (Year 2019, percentage values)*

NACE Rev.2 Classification	Jobs			Job vacancies			Hours worked		
	1-10	10+	1+	1-10	10+	1+	1-10	10+	1+
B-F*	**8.2**	**27.1**	**35.3**	**12.6**	**19.6**	**32.2**	**8.3**	**30.3**	**38.7**
B-E*	**4.7**	**23.6**	**28.3**	**6.2**	**15.4**	**21.6**	**4.7**	**26.4**	**31.1**
B	0.0	0.2	0.2	0.0	0.2	0.2	0.0	0.2	0.2
C	4.5	21.5	26.0	6.0	14.2	20.1	4.5	24.0	28.5
D	0.0	0.6	0.6	0.0	0.3	0.4	0.0	0.7	0.7
E	0.1	1.4	1.5	0.1	0.8	1.0	0.1	1.5	1.6
F	3.5	3.4	7.0	6.4	4.2	10.6	3.6	4.0	7.6
G-S*	**20.9**	**43.8**	**64.7**	**29.4**	**38.4**	**67.8**	**18.1**	**43.2**	**61.3**
G-N*	**17.7**	**38.0**	**55.6**	**24.7**	**33.7**	**58.4**	**5.5**	**38.1**	**53.6**
G	6.9	10.9	17.8	4.7	9.1	13.8	6.5	11.3	17.8
H	1.1	7.0	8.2	1.5	4.6	6.1	1.1	7.7	8.8
I	5.0	5.1	10.1	12.9	7.2	20.1	3.5	4.3	7.8
J	0.8	3.1	3.9	1.4	3.9	5.3	0.8	3.4	4.1
K	0.4	3.1	3.5	0.4	1.3	1.7	0.4	3.2	3.6
L-N*	**3.5**	**8.8**	**12.3**	**3.8**	**7.6**	**11.4**	**3.3**	**8.2**	**11.4**
M	1.9	2.6	4.5	2.0	3.4	5.4	1.9	2.8	4.6
N	1.1	6.0	7.1	1.5	3.9	5.4	1.0	5.2	6.1
P-S*	**3.2**	**5.9**	**9.1**	**4.7**	**4.7**	**9.4**	**2.6**	**5.1**	**7.8**
P	0.2	0.4	0.7	0.4	0.5	0.9	0.2	0.3	0.5
Q	1.2	3.9	5.1	1.7	2.8	4.5	0.9	3.5	4.4
R	0.4	0.7	1.1	0.6	0.8	1.5	0.3	0.5	0.8
S	1.4	0.8	2.2	2.0	0.6	2.6	1.3	0.8	2.0
B-N*	**25.9**	**65.0**	**90.9**	**37.3**	**53.3**	**90.6**	**23.9**	**68.4**	**92.2**
B-S*	**29.1**	**70.9**	**100**	**42.0**	**58.0**	**100**	**26.5**	**73.5**	**100**

*Source: ISTAT data processing (from VELA, OROS and GI surveys)   * Due to rounding problems, the sum of the values of the single sections does not coincide with the value of the corresponding aggregation.*

From the data provided above, it is clear that the extension of the indicators to companies with less than 10 employees strongly reduces the information gap on the variables analyzed.

4. Comparison of the target variables between companies with employees and company with at least 10 employees (average values in the year 2019)

Job vacancies rate in 2019 is increased of 0.1 percentage points (p.p.) with respect to the year 2018 in the total activity (B-S) and in services (G-S), both for the series of total companies and for companies with at least 10 employees. Instead, in industry (B-F) the job vacancy rate is decreased of 0.1 p.p. for the companies with at least 10 employees while it remained unchanged for the series of total enterprises. The highest increase was recorded in the construction sector (F), respectively 0.5 p.p. for companies with at least 10 employees and 0.3 p.p. for the total companies with employees. Job vacancies rate for the total companies with employees is usually higher than that of companies with at least ten employees. The reasons is that job vacancies are proportionally higher than jobs, in companies with less than ten employees. In the year 2019 (Table 3), the job vacancies rate calculated on all companies is equal to 1.4% compared to 1.2% calculated on companies with at least ten employees. Similar differences are also found distinguishing between industry (1.3% compared to 1.0%) and services (1.5% compared to 1.2%). Greater differences are observed for the accommodation and food and beverage sector (section I, with 2.8% in companies with employees versus 2.0% in companies with at least ten employees) and in the other service activities (section S, with a job vacancy rate of 1.6% compared to 1.0%). Hours worked in industry and services (B-S) are increased in 2019 for both series (1.7% for companies with at least 10 employees and 2.8% for total companies) while the hours worked per capita decreased (-0.5% for companies with at least 10 employees and -0.8% for all companies with employees). The increase in hours worked was higher in service sector (G-S) than in industry (B-F) for both series while the decrease in the hours per capita was similar in both sectors. The indices of the hours worked and hours worked per capita, calculated on all companies with employees show values very close to those calculated on companies with at least 10 employees, in almost all sectors. In particular, in 2019 both indicators shown deviations that never exceed 0.5% in total activities (B-S), in industry (B-F) and services (G-S). Higher deviations are observed in those sectors where the weight of companies with less than 10 employees (in terms of jobs, job vacancies and hours worked) is higher than the average (as shown in Table 2). For example, for hours worked in the Arts, entertainment and recreation activities (section R), in the Other activities of services (S), and in Professional, scientific and technical activities (section M) the percentage differences between the two series of dimensional class are 6.0%, 5.9% and -3.9% respectively. For the index of hours worked per capita, the highest differences between the total companies and companies with at least 10 employees are observed in the R section (4.3%) and in the Education sector (section P, with -1.8%).

Table 3 – *Job vacancies rate and hours worked (totals and per capita) by section. Comparison between total enterprises and enterprises with at least 10 employees. Average values for 2019: percentage values and index numbers (base 2015=100); differences in p.p. and percentage changes with respect to year 2018*

| NACE Rev.2 | Job vacancies rate | | | | Hours worked | | | | Hours worked per capita | | | |
| | 1+ | | 10+ | | 1+ | | 10+ | | 1+ | | 10+ | |
	Value	Diff.	Value	Diff.	Index	Var%	Index	Var%	Index	Var%	Index	Var%
B-F	**1.3**	**0.0**	**1.0**	**-0.1**	**107.7**	**2.3**	**108.1**	**1.3**	**101.3**	**-0.8**	**101.4**	**-0.8**
B-E	**1.1**	**0.0**	**0.9**	**-0.1**	**107.0**	**0.8**	**107.7**	**0.7**	**100.9**	**-1.1**	**101.1**	**-1.0**
B	1.2	-0.1	1.2	-0.1	95.2	1.1	96.7	1.7	102.3	-0.2	102.7	-0.4
C	1.1	0.0	0.9	-0.1	107.2	0.8	108.0	0.6	100.9	-1.3	101.0	-1.3
D	0.8	0.1	0.8	-0.2	102.2	-0.2	101.9	-0.5	101.8	0.3	101.9	0.2
E	0.9	0.0	0.8	0.1	108.2	4.4	108.3	4.4	100.6	0.4	100.7	0.4
F	2.1	0.3	1.7	0.5	109.6	8.5	110.7	5.8	102.9	0.9	103.7	0.8
G-S	**1.5**	**0.1**	**1.2**	**0.1**	**114.8**	**3.1**	**114.8**	**2.0**	**98.9**	**-0.7**	**99.3**	**-0.5**
G-N	**1.5**	**0.2**	**1.2**	**0.0**	**114.2**	**2.9**	**114.5**	**1.9**	**98.9**	**-0.8**	**99.5**	**-0.6**
G	1.1	0.0	1.2	0.2	114.5	2.8	116.5	2.6	99.2	-0.6	100.2	-0.4
H	1.1	0.2	0.9	0.2	109.1	2.0	109.2	1.5	100.2	0.2	100.7	0.7
I	2.8	0.5	2.0	0.2	125.7	5.5	128.6	3.5	95.0	-1.1	94.2	-0.4
J	1.9	0.2	1.8	0.1	110.8	3.1	111.1	1.5	100.6	-0.2	100.9	-0.3
K	0.7	0.0	0.6	-0.2	99.0	0.8	98.4	0.8	101.8	-0.1	101.6	-0.3
L-N	**1.3**	**0.1**	**1.2**	**-0.1**	**118.0**	**2.4**	**119.2**	**1.0**	**101.6**	**-1.0**	**101.1**	**-1.7**
M	1.7	0.1	1.8	-0.1	119.3	5.4	124.2	4.4	100.8	1.8	100.5	2.6
N	1.1	0.1	0.9	-0.1	115.6	0.1	115.0	-0.8	101.6	-2.9	100.7	-3.9
P-S	**1.4**	**0.1**	**1.1**	**0.0**	**118.7**	**4.5**	**117.2**	**3.0**	**98.4**	**-0.4**	98.2	0.4
P	1.9	0.4	1.6	0.3	125.3	6.9	127.9	6.1	102.2	1.2	104.1	1.9
Q	1.2	0.1	1.0	0.0	116.6	3.6	118.5	3.1	98.6	0.4	99.4	1.0
R	1.9	0.1	1.6	-0.2	113.7	0.9	107.3	-3.6	90.7	-5.4	87.0	-6.7
S	1.6	0.0	1.0	-0.2	121.8	7.1	115.0	6.5	101.0	0.0	100.6	3.2
B-N	**1.4**	**0.1**	**1.2**	**0.1**	**111.3**	**2.6**	**111.5**	**1.5**	**99.7**	**-0.8**	**100.1**	**-0.8**
B-S	**1.4**	**0.1**	**1.2**	**0.1**	**111.9**	**2.8**	**111.9**	**1.7**	**99.5**	**-0.8**	**100.0**	**-0.5**

Source: ISTAT (VELA, OROS and GI surveys)

5. Dynamics of indicators over the years 2016-2019

The seasonal adjustment carried out over the period 2016-2019, shows how the coverage extension to businesses with less than 10 employees it did not significantly change the dynamics of the series compared to that observed only in companies with 10 or more employees.

During the period considered, the seasonally adjusted series of the job vacancy rate in the total economy (sections from B-S, see Figure 1) show a positive growth trend whether they are calculated on all companies with employees or only on companies with at least ten employees.

Figure 1 – *Job vacancies rate for the total activity in Industry and Services (B-S), in Industry (B-F) and in Services (G-S) - Comparison between total companies with employees and companies with 10 or more employees. I quarter 2016 - IV quarter 2019, seasonally adjusted data, percentage values (left scale) and differences with respect to previous quarter (right scale)*
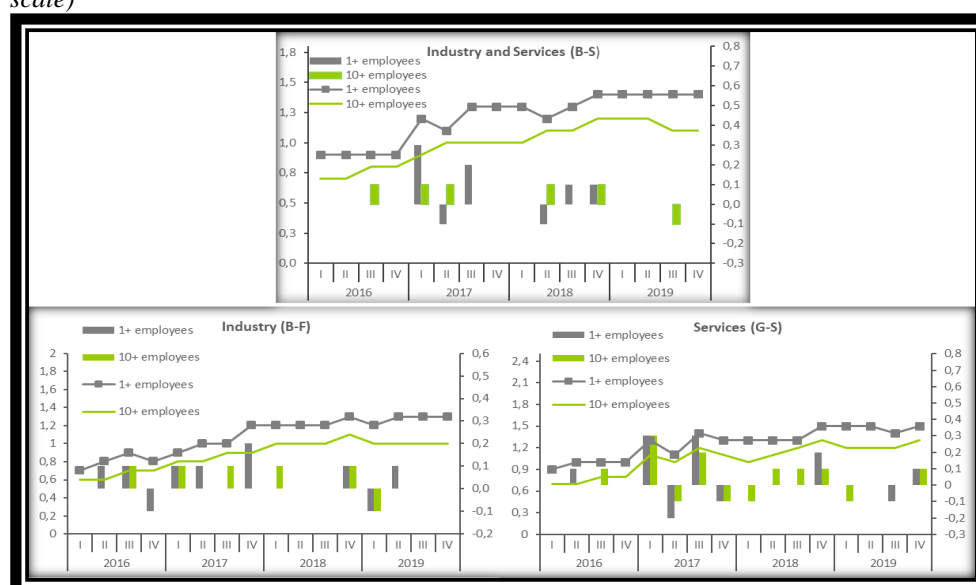
In fact, in the observed period, the job vacancy rate increases from 0.9% to 1.4% in all companies with employees and from 0.7% to 1.1% in companies with at least 10 employees. Starting from the fourth quarter of 2018, the seasonally adjusted job vacancy rate for total companies with employees remains stable at 1.4% for the total economy (B-S), reaching its maximum value. Instead, the job vacancy rate for businesses with at least 10 employees, after reaching its maximum value in the

fourth quarter of 2018 (1.2%), shows a decrease in the third quarter of 2019. The growth is observed both in the industry sector and in the services sector. In industry (B-F, Figure 1), the job vacancy rate for all companies with employees increases from 0.7% to 1.3% while for companies with at least 10 employees from 0.6 to 1.0%. The maximum value in the series of short-term differences is 0.2 percentage points (in the fourth quarter of 2017 for total companies with employees). In the services sector (G-S), the job vacancies rate increases from 1.0% to 1.5% for the total companies and from 0.7% to 1.2% for businesses with 10 or more employees.

The seasonally adjusted series of hours worked in the total economy (B-S), are very similar in terms of levels and dynamics, calculated on all companies with employees and only on companies with 10 or more employees (see Figure 2). There is growth in all quarters, with an average quarterly growth rate of 0.7% during the analyzed years. The year in which there was a greater growth in hours worked, was 2017: the average changes compared to the previous quarter were of 1% for all companies with employees and 1.2% in companies with at least 10 employees. In the services sector (G-S) the two series are growing over the whole period, with a quarterly average growth rate of 0.8% for both series, while in the industrial sector (B-F) there is a growth trend, interrupted in some quarters from negative percentage change with respect to previous quarter. In this sector, the average quarterly growth rate of hours worked was 0.4% for both series.

The dynamics of hours worked per capita in the total economy (B-S, see Figure 3), shows a oscillating trend and of the same sign in the comparison between the series on all companies with employees and that on companies with at least 10 employees. In both series is observed a reduction of the hours worked per capita, more accentuated for the indicator relating to all companies with employees. From the first quarter of 2016 to the fourth quarter of 2020, the seasonally adjusted index of hours worked per capita, for all companies with employees changed from 100.8 to 99.3, with a decrease of -1.5%. The index for companies with at least 10 employees had a more contained reduction (-1.0%), with the index decreasing from 100.8 to 99.7. The reduction in the hours per capita is mainly due to the service sector (G-S). In fact, in this sector the reduction between the first quarter of 2016 and the fourth quarter of 2019 was -1.8% for all companies with employees and -1.6% for companies with at least 10 employees. In the industry sector (B-F), on the other hand, in the same period there was a positive change of 0.3% for all companies with employees and a negative change of -0.6% in companies with at least 10 employees.

Figure 2 – *Hours worked for total activity in Industry and Services (B-S), in Industry (B-F) and in Services (G-S)-Comparison between total companies with employees and with 10 or more employees. I quarter 2016 - IV quarter 2019, seasonally adjusted data,index (left scale, Base 2015=100) and percentage changes with respect to previous quarter (right scale).*
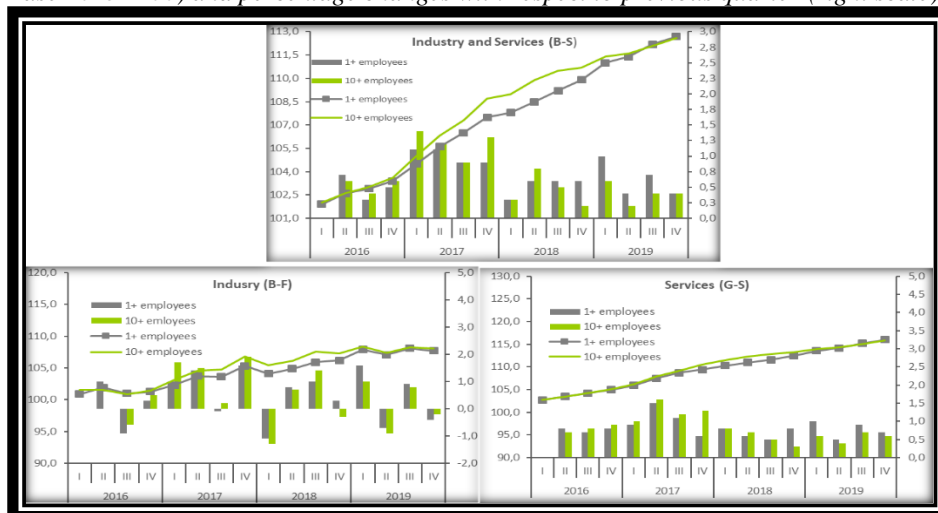
Figure 3 – *Hours worked per capita for total activity in Industry and Services (B-S), in Industry (B-F) and in Services (G-S). Comparison between total companies with employees and companies with 10 or more employees. I quarter 2016 - IV quarter 2019, seasonally adjusted data, index (left scale, Base 2015=100) and percentage changes with respect to previous scale (right scale).*
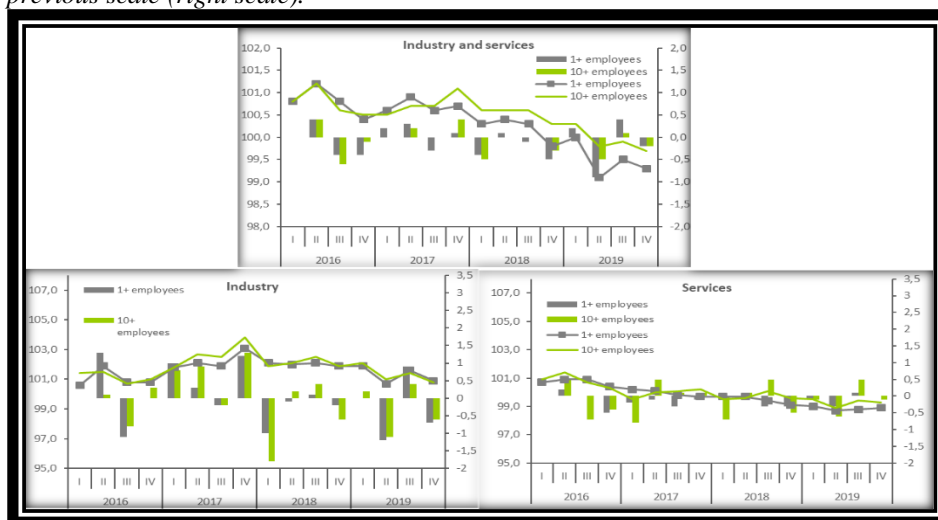
6. Sample error of the estimates

The coefficients of variation (CVs) of the job vacancy rate and hours worked (totals and per capita) obtained for both the total of companies with employees and the companies with at least 10 employees from the quarter 1-2016 to the quarter 4-2019 are illustrated in Figure 4.

The average of the raw job vacancy rate in the period 2016-2020 was 1.0% for companies with at least 10 employees and 1.2% for companies with employees. The coefficient of variation is always higher for the total enterprises with employees: on average the variation coefficient was 4.3% for enterprises with at least 10 employees and 5.4% for enterprises with employees. The limited increase in this variable's coefficient of variation is more than compensated by the extension of the coverage to all enterprises with employees, which fills a relevant information gap.

As regards the hours worked and the hours worked per capita, the values of the coefficients of variation not increased a following the expansion of the observation field of the Vela survey. The coefficients of variation of hours worked are on average equal to 0.32% for companies with at least 10 employees and 0.35% for companies with employees while they for the hours worked per capita is equal to 0.31% for companies with at least 10 employees and 0.32% for companies with employees.

Figure 4 – *Percentage CVs for the total of the economic activities (B-S) from the quarter 1-2016 to 4-2019 (Job vacancies rate, hours worked and hours worked per capita)*
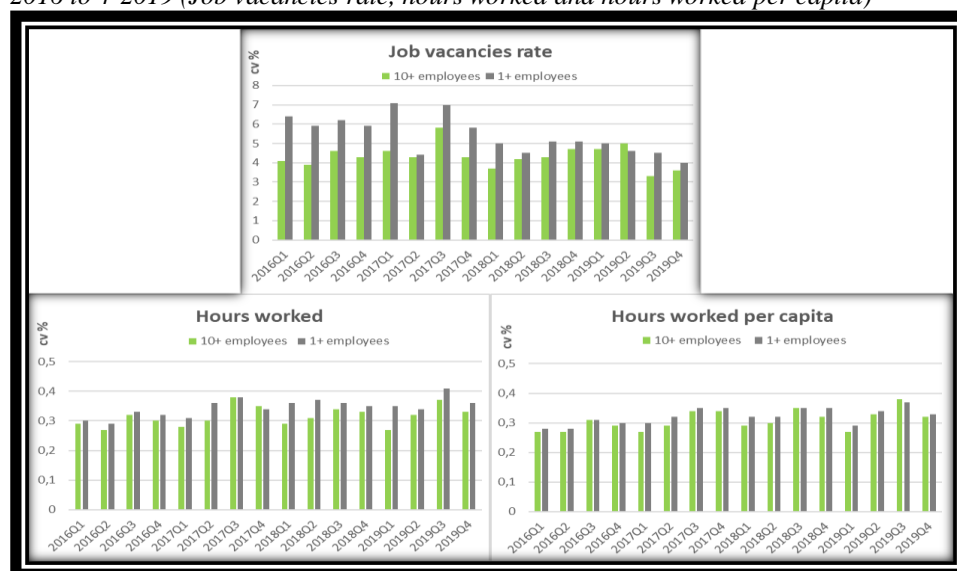
7. Concluding remarks

Starting from the press release on labour market indicators of March 2020, Istat has started to regularly disseminate new seasonally adjusted series of the job vacancy rate and the hours worked indicators.

Before this date, the above-mentioned indicators refer only to enterprises with at least ten employees.

The new series, calculated from the first quarter 2016, include also micro-enterprises with less than ten employees, then extending the coverage to all enterprises with at least one employee.

The coverage extensions fill a significant information gap and meet the requirements of European Regulations on these indicators.

The enterprises with less than ten employees account for around 85% of all enterprises with employees in NACE Rev. 2 Sections B to S, excluding O, and cover a relevant share in terms of labour inputs (29% of all employees and 26% of all hours worked). In terms of job vacancies, the micro enterprises contribute for a much greater share of all vacancies in the covered sections (42%).

The inclusion of micro enterprises has not significantly changed the dynamics of the seasonally adjusted series in comparison with that observed on the enterprises with at least ten employees.

The level of the job vacancy indicator significantly increases with the inclusion of micro enterprises, while hours worked indicators shows quite similar levels comparing the new and old series.

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SUMMARY

Coverage extension to the micro-enterprises for the Istat quarterly indicators on job vacancies and hours worked.

The Italian National Institute of Statistics produces quarterly estimates of the job vacancy rate and hours worked for EU Regulations and national dissemination. To meet the requirements of European Regulations and fill an information gap on the world of micro-enterprises, Istat has extended the coverage of these indicators from the enterprises (in NACE Rev. 2 Sections B to S, excluding O) with at least 10 employees to all those with employees. In fact, on the press release on labour market indicators of June 2019, Istat released for the first time the raw series for the job vacancy rates and the indexes of hours worked for all enterprises with employees, starting from the first quarter of 2016. In February 2020, when the time series were long enough for a more robust identification and correction for seasonal effects, also seasonally adjusted series were release, beside the raw ones.
This innovation has represented an important challenge because the enterprises with less than ten employees account for around 85% of all enterprises with employees in the covered economic activity sectors and employ a much smaller but relevant share of all employees in these sectors (around 28%).
In this work it is analysed the weight of job vacancies, hours worked and hours worked per capita within companies with fewer than ten employees compared to the total companies with employees. The dynamics of the indicators for companies with at least 10 employees and companies with employees for the period 2016-2019 are also compared.
The sampling errors on the series for all companies with employees, measured through the coefficient of variation, remain the same as those for only the enterprises with at least 10 employees for the hours worked indicators. Instead, it increases from an average of 4.3% to 5.4% for the job vacancy rate estimates (over the period 2016-2019). The limited increase in this latter variable's coefficient of variation is, in our opinion, more than compensated by the extension of the coverage to all enterprises with employees, which fills a relevant information gap.

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