Income and job trajectories of Italian employees: an analysis of longitudinal indicators obtained through the micro integration of LFS and statistical registers

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Introduction

The ongoing development of a system of integrated statistical registers on households and business marks a breakthrough in the longitudinal analysis of Italian labour market: in particular, the combined use of statistical registers and survey data gives the opportunity to provide additional domains and tools through the statistical integration of supply and demand information. Although this process is still in progress, both physically and conceptually, this paper intends to provide first evidence of this promising perspective by analysing the individual trajectories of the cohort of Italian 2014 employees in years 2014-2017. The aim is to integrate Labour force survey (LFS) microdata of any target year with microdata from labour and income registers regarding the whole time span in order to understand how the duration of jobs is linked to the dynamics of individual earnings and incomes, one the one side, and to business performance and employment policies on the other side. We are interested in particular in several domains influencing these relationships and the quality of employment.

Section 1 sketches briefly the strategic issues raised by the development of an integrated system of statistical registers, which form the background for the development of this paper. Section 2 describes the construction of the databases derived from LFS and statistical registers, with all the *caveats* and the hypotheses made. Section 3 and 4 are dedicated to descriptive analyses and to some modelling of the relation between job stability, incomes and demand and supply side aspects. Section 5 has a focus on subjective indicators in 2014 and on the way they cope with the individual trajectories in the labour market and with the development of their incomes. Some concluding remarks draw suggestions for further developments.

1. Survey integration: from dedicated integration to multi-domain approaches

The integration of LFS microdata with administrative sources has been exploited at Istat since 2010 for purposes connected to both statistical production and research. The improvements obtained in the use of social security data – tailored mainly for business statistics purposes – are the backbone of this approach. More precisely, the extremely efficient individual identifiers in the

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employer-employee register allowed a direct record linkage with survey data, namely with LFS. In this respect, the European statistical system supported important methodological frameworks for data integration especially as far as administrative microdata are concerned[2].

First outcomes made it clear that the statistical integration of surveys with administrative sources is essentially a matter of choosing the best approach to compare the individual employment status, pointed on the reference week of the interview, with the administrative information referred to the same individual in that same time span.[3]

In this approach the individual employment statuses self-portrayed in the survey by respondents are integrated with the specific set of administrative sources referred to the same phenomenon (employment) although seen through the lenses of the employers in their fulfilment of current social security duties.[4] The decisive role of surveys, possibly subjected to some adjustment in scope, turns out to be reinforced and confirmed, especially when the important weight of informal and undeclared activities in the Italian economy is taken into account[5].

In this context, the combination of relatively long series of individual longitudinal integrated data allows the identification, definition and classification of individual labour "trajectories" combined with both the characteristics of job contracts and the highly detailed information collected through the survey. This perspective adds to recent developments achieved by other integrated statistical registers covering domains not strictly tailored for the analysis of labour market issues such as demography, income, business structure and performance[6].

In this work the main focus is on the analysis of the longitudinal data in the period 2014-2017 of a specific cohort of employees working in the business sector in 2014. Individual trajectories are combined to data on income and to the main characteristics of employers. Few questions are then targeted here for some tentative answers though: how did the individuals in this cohort perform in the subsequent years? How the features of their job contracts in 2014 combine with the evolution of their careers? Are the job satisfaction indicators calculated in 2014 able to predict the quality of their further attainments? What happened to their individual and household income?

[2] The increase in the use of administrative data in current statistical production was made explicit, as a statistical policy issue for the European statistical system (ESS), by the European Commission (2009) itself. The methodological underpinnings of statistical integration were detailed within the activities of the ESSnet on data integration See for example Istat et al. (2012a, 2012b), Kuijvenhoven-Scholtus (2010, 2011), Fosen-Zhang (2011), Thomsen-Villund (2011), Villund (2010), van der Valk (2012), Törmälehto (2008). This framework was first adopted for the estimation of undeclared labour input: in the Italian National Accounts for instance the method currently used since the reference year 2010 is based on the integration of LFS microdata with individual administrative information (mainly social security) that track declared jobs.

[3] This essentially reduces to dealing with, and modeling, the ensuing errors: namely the non-sampling errors coming from the survey and the coverage errors deriving from the administrative sources. These aspects are largely discussed in AA.VV. (2015) where the empirical evidence of the incoherence of survey and administrative source is provided and an error model is consequently introduced to support the production of integrated estimates. Further developments on this issues can be found in De Gregorio et al. (2014), De Gregorio-Giordano (2014, 2016), De Gregorio-Cella (2015).

[4] The statistical independence between the primary information gathered through direct interviewsin in LFS survey and administrative data is of course extremely important in dealing with error modeling. The same cannot be said in general for business surveys, where survey questionnaires and tax data are generally compiled by the same person or business unit.

[5] According to National Accounts estimates undeclared activities have an incidence of 12.4% on GDP and undeclared jobs are 15.6% of total full-time equivalent jobs. The variability of these estimates across sectors and territory is very high. Agriculture, retail trade, accommodation and restaurants, personal services and southern regions, are the most critical domains.

[6] Anitori et. al (2019) for instance find a strong relation between job quality and business structure and performance.

2. The databases

The sub-population under scrutiny is composed by the employees in the private business sector excluding agriculture observed through LFS 2014 sample. Individuals have been chosen according to the following criteria: A) each individual must have declared to be an employee in the reference week of the LFS interview (main job); B) in that same week the individual has to be engaged by a contract in the business sector, this information being traced in the social security records[7]; C) all the individuals who, according to the Income register[8], entered an old age or invalidity pension scheme between 2014 and 2017 have been flagged and excluded from the main elaborations. The cohort that remains is composed by 85.5 thousand records[9] representative of 9.9 million employees[10].

The cohort analysed in this paper corresponds to nearly 60% of total employees measured by LFS (63% including those who retired). The residual remains out of scope: more than one half of it is made of employees in public administrations, the rest is accounted for by undeclared employees, and employees in agriculture and personal services[11].

Each employee in the cohort is obviously described by the variables surveyed from LFS 2014 questionnaire[12]. Each record is linked to his main employer in the reference week of the base year through social security data: details on such relation concern gross earnings and other characteristics of the contract (for instance, working time, duration of the contract, etc.). Similar details are available for all other employers and contracts he declared in years 2014-2017 (main and secondary jobs). For each year, overall gross earnings are also available. Structural information on each employer, including some details of his economic account, is derived from the Business register covering the period 2014-2016. Data on individual income referred to the whole time span are derived from the current Income register[13]. Data on total taxable income 2014-2016, broken down by its main components, are derived from the Income register both at individual and household level: the coefficients to calculate the equivalent household income are derived directly from LFS questionnaire.

[7] In case of more than one contract, the one with the highest total gross earnings in the reference month is assumed as the main job.

[8] The Income register is a statistical register in which income information is collected at individual level according to a scheme closely inspired to the one provided by the Manual of Canberra (Unece 2011). It traces all the stages of income, from Income from production to disposable income. The register totals more than 30 variables. The prototype available for the time being is based on LFS and SILC samples 2013-2017 (the year of reference of income data for SILC): in this register detailed data on income from employee jobs and pension schemes are available as well as detailed data on taxable income by type of income.

[9] They are 54 thousand net of the panel component.

[10] The official figure of total employees jobs in the private sector, excluding agriculture, is about 11 million (source: Business register) since it includes people with a secondary job, people that chose not to declare themselves employees in the survey questionnaire (e.g.: because they prefer to report another main job, or for the occurrence of any possible non sampling error), individuals excluded from the LFS reference population (residents in households) or because they entered into a pension scheme. Almost 6.5 thousand observations, corresponding to individuals entered into pension scheme in the period 2014-2017 were also excluded (the estimated total is nearly 650 thousand employees, 380 thousand of whom benefited of old age pensions and the rest of invalidity pensions).

[11] Limited to personal services where the households is the employer.

[12] More than one half of the observations, due to the LFS panel structure, are observed also in 2015.

[13] The current beta version is built on the subpopulation sampled in LFS and SILC survey from 2013 to 2017. Income register is still in progress and a limited set of variables is available, concerning taxable income by type, by kind of job, from pension schemes and for other social security treatment.

3. Survival analysis and stability of employee jobs

Considering the LFS cohort in 2014, where employees are selected according to the steps recalled above, it is possible to observe a constant loss in their amount. In particular, about 10% of the employees in the current year do not leave traces of private employee jobs in the following year. In 2017 only slightly more than 70% of 2014 employees persist in this condition. This phenomenon can be observed also when considering the cohorts observed between 2015 and 2017.

More interestingly, the earnings of those who remain in the job increase year by year: in 2017 the median gross earnings of the initial cohort was in fact almost 15% higher. Turnover dynamics seem to affect low earners whilst persistent individuals tend to have better wages as compared to exits: this effect in particular seems to work also backwards, although slightly smoothed (see for example the 2017 cohort).

Table 1 - Cohorts of LFS employees in the private sector, by year and LFS reference year (a,d)

	LFS Employees with contractual coverage in LFS reference week (.000)			LFS Employees with contractual coverage in the 4-year period 2014-2017 (d). Index (Base: LFS reference year=100)				Median yearly total gross earnings (c). Index (Base: LFS reference year=100)			
LFS reference year	LFS records	LFS estimates	Median yearly gross earnings (c)	2014	2015	2016	2017	2014	2015	2016	2017
2014	85.5	**9,941**	**22,091**	**100**	91.4	79.7	71.2	**100**	105	110.7	114.3
2015	86.7	**10,162**	**22,369**	89.9	**100**	90.8	79.3	99.9	**100**	104.3	108.9
2016	88.1	**10,568**	**22,537**	75.7	90.4	**100**	91	102.1	98.9	**100**	103.4
2017	91.4	**10,984**	**22,588**	65.5	76.6	89.5	**100**	103.2	101.2	100.3	**100**

Sources: Istat, LFS 2014 and Income register 2014-2017
Notes: (a) The cohort is identified by employees in the private sector (excluding agriculture) and it is derived from LFS microdata integrated with Income register records. Only individuals who declare themselves employed and with a job in the reference week of the interview are considered; (b) The cohort excludes those who entered in old age or invalidity social security treatment in the period; (c) Including secondary employee jobs; (d) At least one contract per year, independently of its duration, including those who entered the public sector as employees (2015-2019).

Table 2. Cohort of 2014 Italian employees according to the continuity of their contracts in the period 2014-2017 (a,b)

	Employees (.000)					Median monthly gross earnings. Index: Total 2014=100 (d)			
	2014		Indices. Base: 2014=100						
Number of months with contracts as employees (d)	N (.000)	%	2015	2016	2017	2014	2015	2016	2017
[1-12] months	229	*2.3*	22.3	7.9	10.5	59.5	50.4	46.2	67.0
[13-24] months	473	*4.8*	91.5	31.7	33.4	69.9	69.2	58.5	65.0
[25-36] months	696	*7.0*	96.3	93.4	64.2	73.6	73.2	74.0	72.7
[37-47] months with breaks	1,705	*17.1*	100.0	100.0	100.0	79.5	81.1	83.5	85.0
No beaks and more than one employer	1,567	*15.8*	100.0	100.0	100.0	99.6	103.9	105.8	103.4
No beaks and same employer	5,272	*53.0*	100.0	100.0	100.0	114.7	118.2	120.0	121.7
TOTAL	**9,942**	***100***	**97.5**	**94.2**	**92.3**	**100.0**	**105.6**	**110.4**	**113.9**

Sources: Istat, LFS 2014 and Income register 2014-2017
Notes: (a) The cohort is identified by employees only the private sector (excluding agriculture). The cohort is derived from LFS microdata integrated with Income register records. Only individuals declaring themselves employees and with an employee job in the reference week of the interview. (b) The cohort excludes those who entered in old age or invalidity social security treatment in the period; (c) The cohort excludes those who entered in old age or invalidity social security treatment in the period; (d) Including those who entered the Public sector as employees (2015-2019).

The continuity in employment is also strictly linked to the quality of employment. Considering the 48-months period from 2014 to 2017, each individual can be described for example by the number of months worked, by the number of contract breaks (interruptions) and by the number of

different employers whom they worked for. In total, more than two employees out of three worked without any interruption in the whole period (53% with only one employer, 15,8% with more employers). On the contrary, almost one third of the employees had at least one interruption in employment (15.9% a break, 10.8% 2-3 breaks and 4.5% 3 or more breaks). The precarious working conditions of these individuals are clearly reflected on their incomes and, generally, on their individual well-being (see below).

As expected, the most important variable clearly related with continuity in employment is the type of contract: the incidence of persistent employees decreases from the three quarters of those who had an open-ended contract in 2014 to less than one third of those endowed with fixed-term contracts; as opposite, the incidence of employees with the lowest duration (1-24 months) is respectively 6% and 19%. Job tenure is as well an important predictor of job duration: the share of persistent employees with the same employer rises from than 40% among those who (in 2014) started the current job no more than two years earlier to nearly 90% for those who had been doing the same job for at least 20 years. The economic sectors associated to a greater stability are industry and business services while sectors where jobs are more unstable are construction, accommodation and food service and above all (and quite obviously) temporary agencies.

The structural characteristics of the business side of the job relationship are closely linked to job stability: persistent employees account for more than 80% of the personnel of joint stock companies and for nearly 50% of that of individual firms (Figure 1). Stability increases with business size (a variable which is strictly related to legal structure) and with business performance: it is higher where firms grow (in terms of value added or turnover) or compete in foreign markets.

Furthermore, stability is also linked to indicators related to the quality of employment: the incidence of persistent employees is lower among time-related underemployed and involuntary part-timers (both more than 50%), among low pay workers (less the 40%) and among those who have basic occupations (more than 60%) or are over-educated (64%). There are strong interconnections among the different dimensions linked to the quality of employment.

As far as the socio-demographic characteristics of the worker are concerned, foreigners are the most disadvantaged: only 52% of them is persistently employed in the 48-months, much less than the average incidence among Italian citizens (more than 70%) (Figure 2). Lower permanence in employee status also affects women, young people and the southern regions[14].

In order to analyze the importance of the type of contracts in predicting job stability, a longitudinal variable that takes into account the combination of contracts over the 48-months period was used. The concurrent analysis of the number of paid months makes evident the sharp precariousness of the individuals who in the period had fixed-term contracts: only 4.5% of the total had all the 48 months paid, compared to 79% of the employees with only open-ended contracts (Figure 3). Moreover, a lot of individuals showed fragmented careers, with a succession of moments of employment and not employment.

[14] The relationship between lower job quality and the incidence of undeclared jobs deserves further research efforts. This evidence was clearly noticed in De Gregorio-Giordano (2016).

Figure 1 – Stability of work by features of the company and of work. Cohort of 2014 Italian employees (a, b)

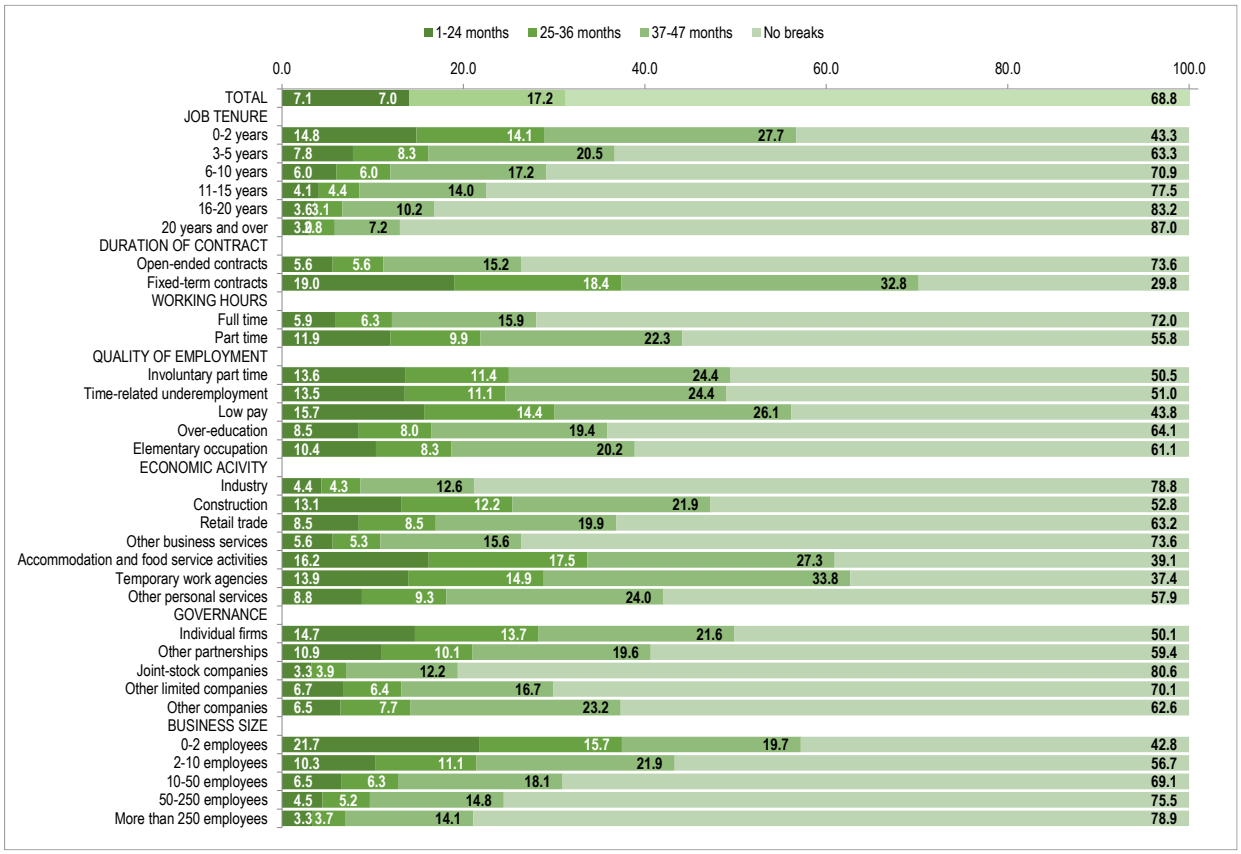
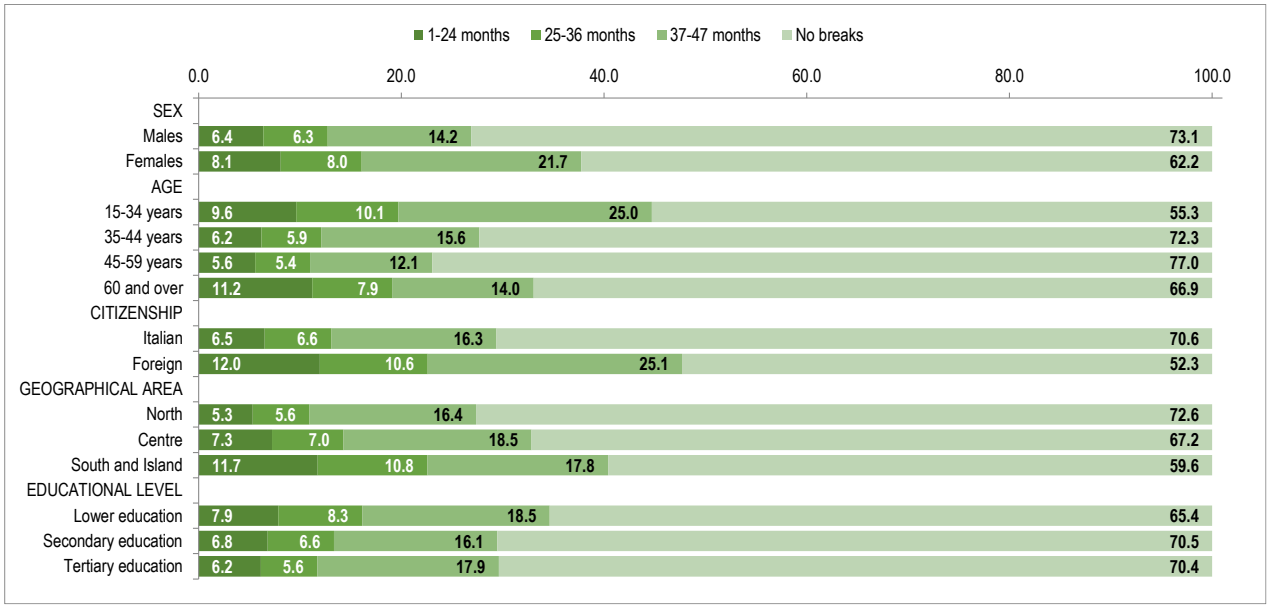


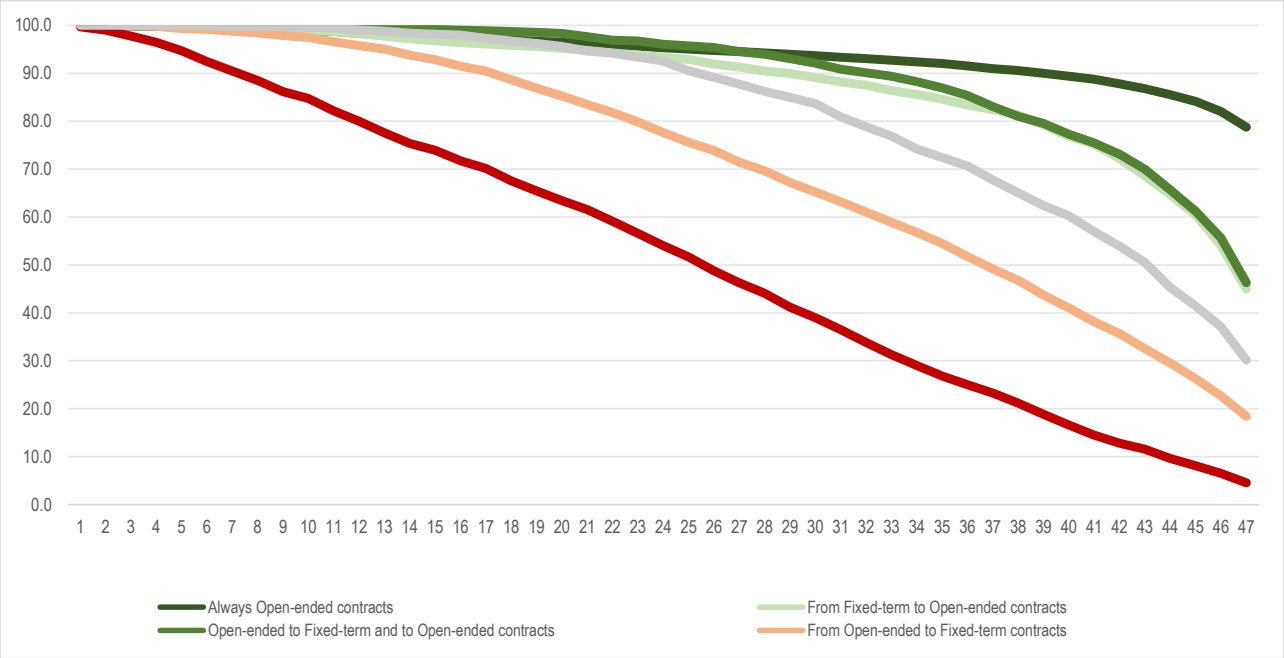
Figure 2 – Stability of work by socio-demographic characteristics. Cohort of 2014 Italian employees (a, b)



Sources: Istat, LFS 2014 and Income register 2014-2017

Notes: (a) Only private sector (excluding agriculture). The cohort is derived from LFS microdata integrated with Income register records. Only individuals declaring themselves employees and with an employee job in the reference week of the interview. The cohort excludes those who entered in old age or invalidity social security treatment in the period; (b) Individuals with more than one employee job might sum up potentially more than 12 months of enrolment each year.

Figure 3 – Stability of work by combination of type of contracts. Cohort of 2014 Italian employees (a, b)



Sources: Istat, LFS 2014 and Income register 2014-2017

Notes: (a) Only private sector (excluding agriculture). The cohort is derived from LFS microdata integrated with Income register records. Only individuals declaring themselves employees and with an employee job in the reference week of the interview. The cohort excludes those who entered in old age or invalidity social security treatment in the period; (b) Individuals with more than one employee job might sum up potentially more than 12 months of enrolment each year.

4. Stability and incomes

There is a clear evidence that continuity in employment has a positive relation with gross earnings. The average monthly gross earnings actually accrued in 2014 to fully persistent employees in 2014-2017 nearly double those of individuals with interruptions (see Table 4.1). The shorter their experience as employees the lower the average gross earnings they experience. In particular, the third quartile of the gross earnings of the individuals with the shortest class of duration is very near to the first quartile of the earnings of persistent employees: a clear evidence that job instability and lower pay come together.

Nevertheless, it is worthwhile noticing that lower persistence comes along also with a higher relative variability: the coefficient of variation of gross earnings nearly doubles when passing from the most to the less persistent employees. Actually, this is related to the higher incidence of part-time contracts, which in fact more than doubles among the less persistent employees (45% of whom work part-time). Quite obviously, the difference in actual gross earnings is strongly affected by part-time jobs. In order to avoid this effect, the lower part of table 3 compares full-time equivalent average monthly earnings, estimated with the aid of the auxiliary information contained in administrative sources[15]. It emerges clearly that the differences in terms of full-time equivalent earnings lowers and that such differences are very small among the various persistency classes of discontinuous workers. To sum up, the discrimination between highly persistent and poorly persistent employees runs directly through lower pays only for half lot whilst the remaining half derives from solutions driven through the labour contract.

[15] Part-time contracts are associated with the share of part-time with respect to full-time. This share is used to turn monthly part-time earnings into full-time equivalent amounts.

This aspect is further analysed through a very simple logistic model, whose main results are shown below in Table 4[16]: fixed-term contracts appear to be the effect which is more strongly related to discontinuity in dependent employment; nonetheless, full equivalent earnings and (to a lesser extent) part-time contracts also play a major role. The effect of contracts seems to outpace also the few structural characteristics that influence job security (territory, gender and the condition of underemployment as measured by LFS). Quite interestingly, it should also be noticed that while the importance of most effects reduce their influence as age grows, the contrary happens to fixed-term contracts as well as time-related underemployment whose importance in predicting discontinuity is certainly higher for older employees.

Income in 2014 shows a positive relation with the degree of continuity of employee jobs (see Table 5). As far as individual income is considered, the distance between the two extremes of employment continuity is even sharper as compared to the one observed with earnings, especially in the left tail of the distribution. For the most discontinuous employees the extent of the no-tax area is significantly larger, eight times if compared with continuous employees. Relative variability is also larger for discontinuous employees, in evident analogy with gross earnings. Quite interestingly household conditions partly change this picture. Equivalent income, in fact, is more evenly distributed and the distance between the most and the least continuous is halved when household support is accounted for: this effect is particularly evident in the left tail of income distribution.

The instability of jobs in the private sector is thus not only paired – as shown before – by lower job standards in terms of earnings and general quality of labour contracts and arrangements (e.g.: in terms of duration or working time) – but it also seems to be not paved back by the intervention of other forms of employment (such as in the public administration) or regular self-employment. Incomes for individuals with discontinuous jobs fall sharply and even the support of their households cannot avoid a worsening of equivalent incomes. A corollary of this evidence is that dependent employment in the business sector – although it accounts for only a slice (the larger indeed) of total employees – seems to have no systematic substitutes in any other forms of employment.

In this respect, income dynamics is quite different among the various duration classes (Table 6). Almost one half of higher persistence individuals experienced an increase in their personal income between 2014 and 2016. This share is sharply reduced in the lower persistency classes. It should be noticed also that the persistent employees who had always the same employer are also characterised by a greater stability of their income while changes in employers seem associated with a higher income variability. More importantly, low persistence is evidently characterised by decreasing incomes and high instability. Household incomes, coherently with previous results[17], slightly smooth income inequality also in terms of dynamics: nevertheless the differences remain extremely severe.

[16] These integrated data certainly deserve more adequate and sophisticated multivariate analyses.
[17] See Anitori et al. (2019).

Table 3 - Gross earnings of the cohort of 2014 Italian employees by overall duration of their labour contracts in the period 2014-2017 and type of earnings (a) - Year 2014 (Indices. Base: Total employees=100)

Duration	Mean	Q1	Median	Q3	CV (%)
			Gross earnings (b)		
[1-12] months	40,8	24,3	32,6	43,4	99
[13-24] months	62,5	50,9	56,7	67,7	74
[25-36] months	63,4	57,9	61,7	67,0	68
[37-47] months with breaks	73,2	71,2	73,3	73,9	62
No beaks and more than one employer	105,6	111,5	102,4	104,1	56
No beaks and same employer	117,8	135,9	116,1	113,0	49
TOTAL	**100,0**	**100,0**	**100,0**	**100,0**	**59**
			Theorical full-time equivalent gross earnings (c)		
[1-12] months	78,7	84,0	82,2	77,5	132
[13-24] months	84,2	87,2	85,9	80,7	115
[25-36] months	82,6	88,0	85,8	80,1	78
[37-47] months with breaks	87,3	92,8	90,4	85,2	83
No beaks and more than one employer	104,5	99,6	100,9	105,9	97
No beaks and same employer	107,4	108,9	107,9	107,9	80
TOTAL	**100,0**	**100,0**	**100,0**	**100,0**	**87**

Sources: Istat, LFS 2014 and Income register 2014-2017

Notes: (a) Only employees in the private sector (excluding agriculture). The cohort is derived from LFS microdata integrated with Income register records. Only individuals declaring themselves employees and with an employee job contract covering the reference week of the interview. The cohort excludes those who entered in old age or invalidity social security treatment from 2014 on; (b) Gross earnings actually paid to the employee including extra-treatments (e.g. illness, unemployment, household benefits, etc.). Including earnings from employee jobs in the Public sector; (c) Gross earnings as defined in the contract, converted into a full time equivalent scale. Only private sector.

Table 4 - Odds ratio of the probability of having interruptions in employee jobs in 2014-2017

	Below 35 yrs.			35-55 yrs.			Over 55 yrs		
		95% Confidence limits			*95% Confidence limits*			*95% Confidence limits*	
Effect	Estimate	*Lower*	*Upper*	Estimate	*Lower*	*Upper*	Estimate	*Lower*	*Upper*
Fixed-term contract (vs. others)	3.60	*3.33*	*3.88*	6.23	*5.82*	*6.67*	8.95	*7.11*	*11.27*
Part-time contract (vs. others)	1.50	*1.40*	*1.60*	1.29	*1.22*	*1.36*	1.43	*1.24*	*1.66*
Fte gross earnings (1st quartile vs. 4th)	3.08	*2.83*	*3.35*	3.24	*3.04*	*3.46*	2.75	*2.31*	*3.27*
Female (vs. Male)	1.97	*1.86*	*2.10*	1.33	*1.27*	*1.39*	1.04	*0.91*	*1.18*
Central Italy (vs. North)	1.30	*1.20*	*1.40*	1.20	*1.14*	*1.27*	1.18	*1.03*	*1.36*
Southern Italy (vs. North)	1.76	*1.64*	*1.89*	1.92	*1.83*	*2.02*	1.34	*1.18*	*1.52*
Underemployed (vs. others)	1.17	*1.03*	*1.34*	1.83	*1.68*	*2.00*	1.72	*1.38*	*2.15*

Sources: Istat, LFS 2014 and Income register 2014-2017

Notes: All the effects are referred to 2014

Table 5 - Gross annual taxable income of the cohort of 2014 Italian employees by overall duration of their labour contracts in the period 2014-2017 and type of income (a) **- Year 2014**

Duration	% no tax area	Indices (Base: Total cohort=100) Mean	Q1	Median	Q3	CV (%)
		Individual income (c,d)				
[1-12] months	3.1	51.2	38.1	49.1	54.1	90
[13-24] months	1.2	67.4	58.1	65.5	71.0	82
[25-36] months	1.2	70.5	64.1	69.5	71.3	88
[37-47] months with breaks	0.8	79.4	78.3	80.4	78.7	73
No beaks and more than one employer	0.6	103.4	106.3	101.6	103.7	62
No beaks and same employer	0.4	114.4	126.6	112.2	111.3	57
TOTAL (euro)	0.7	23,855	15,064	21,177	28,133	66
		Household equivalent income (c,d)				
[1-12] months	1.6	68.2	56.1	64.5	72.7	78
[13-24] months	0.5	78.4	69.8	73.4	80.7	76
[25-36] months	0.5	78.1	69.2	75.2	79.0	81
[37-47] months with breaks	0.4	89.5	86.1	88.0	90.0	69
No beaks and more than one employer	0.2	102.9	104.5	103.5	103.0	61
No beaks and same employer	0.1	108.7	117.8	109.6	106.5	58
TOTAL (euro)	0.3	23,397	13,799	20,931	29,035	64

Sources: Istat, LFS 2014 and Income register 2014-2017
Notes: (a) Only employees in the private sector (excluding agricolture). The cohort is derived from LFS microdata integrated with Income register data. Only the individuals who declare themselves employees and with an employee job contract covering the reference week of the interview are considered. The cohort excludes those who entered in old age or invalidity social security treatment from 2014 on; (b) Includes amounts corresponding to social secutiry treatments excluding first pillar pensions (e.g. illness, unemplyment, household benefits, etc.); (c) Including capital income and income from self-employment, as declared to the tax authority; (d) Indicators are computed excluding individuals in the no tax area.

Table 6. 2014-2016 dynamics of annual gross annual taxable income of the cohort of 2014 Italian employees by duration of their contracts and type of income.

Duration	Personal income Decrease	Stable	Increase	Total	Household income Decrease	Stable	Increase	Total
[1-12] months	79.5	3.5	17.0	100.0	68.1	5.7	26.2	100.0
[13-24] months	81.9	2.5	15.6	100.0	70.9	6.3	22.8	100.0
[25-36] months	61.9	6.6	31.5	100.0	54.0	9.9	36.1	100.0
[37-47] months with breaks	32.2	17.7	50.1	100.0	30.0	17.8	52.2	100.0
No beaks and more than one employer	22.4	26.2	51.4	100.0	23.6	23.6	52.8	100.0
No beaks and same employer	14.8	39.5	45.7	100.0	19.5	31.3	49.1	100.0
TOTAL (euro)	**27.0**	**28.8**	**44.3**	**100.0**	**27.9**	**24.5**	**47.5**	**100.0**

Sources: Istat, LFS 2014 and Income register 2014-2017

5. Subjective indicators as predictive of job stability

Instability, precariousness and insecurity are very often used as synonyms to indicate a critical situation in which a worker finds himself in. Actually, worker can face several critical situations and each should be named with a different word. Instability can refer to the legal aspect of

employment, for which fixed-term employment contract is considered unstable. However, as we have seen, not all open-ended contracts are really permanent and stable, especially in small businesses. To define this situation we can adopt the word precariousness, which refers not to a specific time (reference week in LFS) but to a more or less long period of his career. Finally, the subjective dimension of critical situations must be distinguished. In fact, as we will see, the feeling of job insecurity is linked to instability and precariousness but the legal aspect does not always coincide with job stability (Reyneri-Pintaldi, 2013). The integration of microdata allows us to analyse the three aspects together.

As we have seen, employees with open-ended contract are likely to have higher duration in employment. Considering job insecurity as perceived by the workers, people who are afraid to lose their jobs in the short term (six months following the interview) and that despair to find another similar position suffer by a greater insecurity. On the contrary, people for whom losing job is unlikely are in the most favourable position in term of precariousness (Figure 4).

From the joint analysis of job insecurity, formal characteristics of the job and the duration of employment in the target period, individuals who are afraid to losing their job are also those with a lower duration for both open-ended and fixed-term contracts (Figures 4). In other words, in household surveys subjective indicators allow us to focus and understand the conditions of job instability: at the moment of the interview, the perception of insecurity declared by the respondents can be considered as a good predictor of what will happen in the future. These results are very important considering that longitudinal data are not always available. Of course, only the combination of both types of indicators will provide a comprehensive picture regarding employment security.

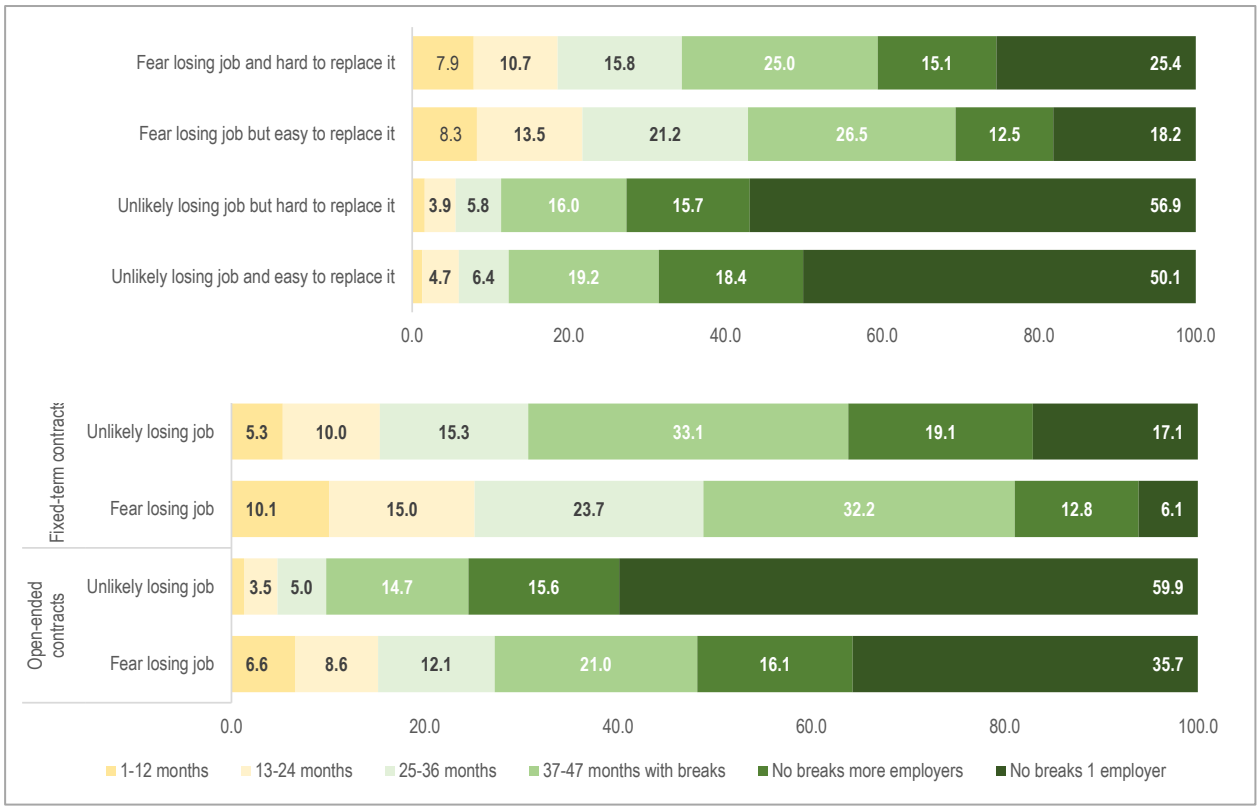
Taking into account job satisfaction, in general having a job is an element of satisfaction, especially in periods of low demand and high unemployment, and even more in an economy offering few opportunities for "good" employment and low social mobility. In 2014, a set of job satisfaction indicators (on a scale from 0 to 10) covering several domains show that the average scores were above seven for all dimensions, except for those concerning earnings and career (6.6 and 6.0, respectively). Continuity in employment, as measured through the 2014-2017 cohort, shows a positive relation with job satisfaction: the average score increases by almost one point in passing from lower to higher persistency (Figure 5). Analogous increases are reported for the domains of job stability, earnings and working time.

Business governance seems also tied to job satisfaction[18]. The employees of joint-stock companies are generally more satisfied in relation to the stability for work (7.4) and to earnings (6.9), showing higher score with respect to the employees of individual firms (6.8 and 6.3, respectively). This is not surprising, given the strong relationship between the type of company and the continuity of earnings (par. 3 and 4). On the other hand, individual firms seem to perform better on specific domains, such as work relationships and distance home-work. Larger businesses have more impersonal organizational standards than the smaller ones.

These results show the existence of a clear relation between objective and subjective dimensions of employment quality: job satisfaction captures how people feel about different aspects of their work, a subjective indicator linked to work motivation and well-being. Furthermore, it confirms that the feeling of job insecurity involves more negative judgments on all the dimensions related to the quality of employment.

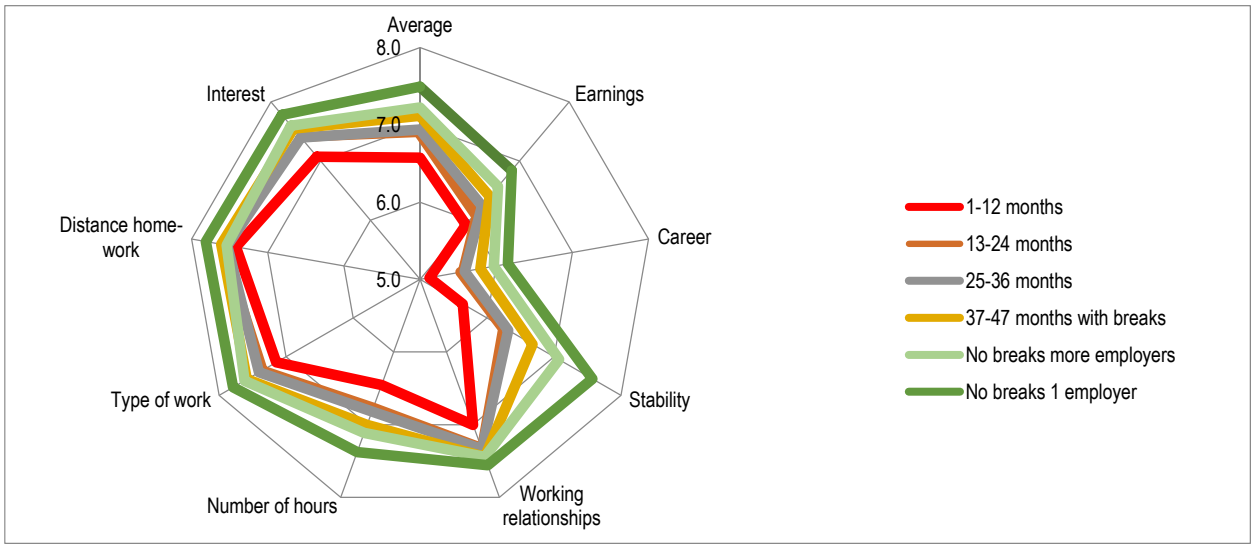
[18] See Anitori et-al. (2019) who deeply discuss this issue.

Figure 4 – Instability, precariousness and insecurity of job. Cohort of 2014 Italian employees (a)



Notes: (a) Only the private sector (excluding agriculture). The cohort is derived from LFS microdata integrated with Income register records. Only individuals declaring themselves employees and with an employee job in the reference week of the interview. The cohort excludes those who entered in old age or invalidity social security treatment in the period; (b) Individuals with more than one employee job might sum up potentially more than 12 months of enrolment each year.

Figure 5 – Instability, precariousness and insecurity of job. Cohort of 2014 Italian employees (a)



Notes: (a) Only the private sector (excluding agriculture).

The cohort is derived from LFS microdata integrated with Income register records. Only individuals declaring themselves employees and with an employee job in the reference week of the interview. The cohort excludes those who entered in old age or invalidity social security treatment in the period; (b) Individuals with more than one employee job might sum up potentially more than 12 months of enrolment each year.

Concluding remarks and further developments

This paper deals with two main issues. The first one has a quite outlook. The integration of LFS microdata with statistical registers (namely Labour, Income and Business register) results extremely promising under several perspectives tied with employment quality measurement issues. For instance, the actual labour contract's characteristics are of paramount importance to highlight the "objective" elements laying behind "subjective" LFS information on employment status. Personal and household income and data on monthly and annual gross earnings strengthen and further detail the nature of the individual trajectories in the labour market. Furthermore, business side variables allow important underpinnings in the relationship between job quality and the multiple domains of business quality.

The second issue has to do with the role that survey and register integration can play in testing, qualifying and creating indicators on the quality of employment. In particular, longitudinal individual data in the statistical register give the possibility to go beyond a cross sectional approach, and to follow individuals and their professional careers over time, especially in terms of job stability, career, contracts, earnings and incomes. This makes it possible a dynamic approach to evaluate the quality of employment. Moreover, the working history can also be followed forwards or backwards, by reconstructing the working path that led to the current employment status.

Register based indicators related to the quality of employment may concern the dynamics of annual and monthly gross earnings, the actual coverage of paid-work periods, the survival rate in the employment status, the number and type of interruptions, the nature of employers associated to individual trajectories, etc.. Furthermore, family income is useful as a context indicator to assess the role played by households as social safety nets for the individual worker (for example the concept of working poor takes on a different meaning if it concerns a parent of a single income family or the child who lives in a family where both parents work).

The results presented here derive from first experiments on a beta version of the Income register limited to employee jobs in the private (non-agricultural) sector. A further step forward, with the completion of statistical registers, will be to add detailed information on the rest of employee jobs (public employees, agriculture) and on self-employment. Authors are aware that careers in public employment are more stable, with the exception of the education sector, while in agriculture working careers are very discontinuous and affected by undeclared labour input. Differently self-employment is very heterogeneous, and the integration with the registers will allow studying in more detail their incomes over time, the characteristics of entrepreneurs and the new profiles of self-employment as defined by the new ILO regulation (such as the dependent contractors).

A promising aspect to be further exploited has to deal with the relation between survey and registers which in our opinion are complementary and not substitutes. The integration of the sources allows a more in-depth analysis of the labour market that by contrast cannot be achieved through the use of a single source. For example, dependent contractors can only be identified through a household survey but the registers allows the possibility to add further sets of indicators to better characterize them.

It seems very plausible, according to our results, that subjective indicators are good predictors of the future condition of individuals, confirming also that the latter are aware of their own working condition as well as of aspects not directly collected through the survey or not bound by the legal form of the contract. In general, individuals tend to declare their own employment status rather than the formal one. These first results suggest that any incoherence between the *de-facto* (from LFS)

and the formal (register) employment condition carry very important and useful information in the analysis of labour markets. Very often, such differences may indicate different and more complex phenomena rather than simple inconsistencies (for example the false part-time contracts tracked in the administrative source which are actually full-time jobs part-of which undeclared).

The abundance (sometimes redundancy) of information surely deserve a strong effort in statistical treatment and modelling, but this is out of the scope of this paper whose approach remains mainly descriptive as results are part of a currently ongoing research. The current focus is, for instance, on the understanding of the informative structure of the integrated indicators on the quality of employment and in particular on the complexity of this structure. The Appendix reports some (very recent) results obtained from a Multiple Correspondence Analysis (MCA) applied to the job quality indicators built from the integration of survey and statistical registers. The main dimension (12%) of the integrated database summarizes several dimensions of the quality of employment: on the one side from the opposition of low incomes and gross earnings, job dissatisfaction, job instability, underemployment etc., and on the other side from the exact opposite. A second dimension (6%) opposes median (and increasing) incomes, job stability, high job tenure and moderate job satisfaction to decreasing incomes, job instability, unemployment and dissatisfaction. As expected[19], a third dimension (5%) depicts the apparent contradiction between medium-high incomes and gross earnings, relatively stable jobs, but accompanied by a generally low job satisfaction, against low incomes and earnings, precariousness but high satisfaction (for working time, due to the interest for the job and for its stability); in this case dissatisfaction reminds the concept of relative deprivation (Merton, 1961).

Quite interestingly, the below-the-median income individuals can be partitioned into several clusters. A quick glance at them shows some of these clusters: the youngers, with fixed-term contracts, decreasing incomes, highly unstable jobs and very worried for their instability; the individuals with open-ended contracts, low education, stable incomes, working in well-performing firms, with high tenure, mainly in the northern regions; a cluster made of strongly dissatisfied individuals, with very low incomes, in search of an alternative job and highly insecure of their current one, mainly working in services; finally, a cluster very similar to the latter, characterised by a strong incidence of foreigners, employed mainly by very small individual firms, but relatively satisfied for their employment status and probably for having a job whatever it is.

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[19] And coherently with other results (see Anitori et al. 2019).

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Appendix. Coordinates of active variables on the first three factors of ACM

VARIABLES	Factor 1	Factor 2	Factor 3
In search of another job			
Yes	-1.50	0.68	-0.74
No	0.07	-0.03	0.03
Contract durations by source in 2014-2017			
Open-ended contracts in both sources	0.18	-0.04	-0.07
Open-ended (Survey) - Fixed-term (Register)	-0.89	0.04	0.37
Open-ended (Register) - Fixed-term (Survey)	-0.74	0.08	0.59
Fixed-term contracts in both sources	-1.31	0.39	0.42
Job tenure			
≤2	-0.85	0.22	0.40
3-5 years	-0.21	-0.04	0.07
6-10 years	0.07	-0.07	-0.03
11-15 years	0.25	-0.10	-0.13
16-20 years	0.39	-0.17	-0.19
≥20 years	0.58	0.09	-0.23
Overqualified			
No	0.07	0.00	0.01
Yes	-0.19	0.00	-0.03
Underemployed			
Yes	-1.42	0.46	-0.39
No	0.08	-0.03	0.02
Uncertain stability of the job			
Yes	0.14	-0.05	0.04
No	-1.15	0.38	-0.35
Number of contract interruptions in 2014-2017			
None	0.37	-0.11	-0.14
1	-0.67	0.17	0.31
2	-0.93	0.28	0.28
3	-1.01	0.36	0.32
>3	-1.20	0.45	0.37

VARIABLES	Factor 1	Factor 2	Factor 3
Working time			
Ful-time	0.22	-0.02	-0.06
Involuntary part-time	-1.19	0.25	0.05
Other part-time	-0.24	-0.17	0.57
Number of months with a contract in 2014-2017			
≤36	-1.12	0.40	0.28
37-47	-0.63	0.14	0.34
48 with more than one employer	0.08	0.04	-0.16
48 with the same employer	0.46	-0.16	-0.13
Job satisfaction in general			
Low	-1.01	0.32	-1.01
Medium	-0.17	-0.12	-0.64
High	0.31	0.01	0.61
Satisfaction for earnings			
Low	-0.81	0.11	-0.62
Medium	0.02	-0.15	-0.23
High	0.50	0.14	0.73
Satisfaction for career			
Low	-0.54	0.04	-0.49
Medium	0.08	-0.13	-0.21
High	0.50	0.15	0.89
Satisfaction for working time			
Low	-1.05	0.47	-0.77
Medium	-0.09	-0.09	-0.55
High	0.33	-0.05	0.59
Satisfaction for job stability			
Low	-1.04	0.33	-0.55
Medium	-0.15	-0.17	-0.46
High	0.43	0.00	0.47
Interest for the current job			
Low	-1.03	0.27	-1.01
Medium	-0.26	-0.16	-0.64
High	0.26	0.05	0.46

VARIABLES	Factor 1	Factor 2	Factor 3
Full time equivalent gross earnings			
Below first quartile	-0.99	0.15	0.38
Between first and second quartile	-0.21	-0.66	0.15
Between second and third quartile	0.31	-0.54	-0.26
More than fourth quartile	0.84	1.02	-0.25
Annual gross earnings			
Below first quartile	-1.20	0.45	0.32
Between first and second quartile	-0.25	-0.70	0.36
Between second and third quartile	0.42	-0.99	-0.40
More than fourth quartile	1.02	1.21	-0.27
Monthly gross earnings			
Below first quartile	-1.15	0.41	0.29
Between first and second quartile	-0.26	-0.71	0.37
Between second and third quartile	0.39	-0.95	-0.39
More than fourth quartile	1.00	1.22	-0.26
Personal income			
Below first quartile	-1.18	0.42	0.33
Between first and second quartile	-0.25	-0.72	0.34
Between second and third quartile	0.41	-0.89	-0.39
More than fourth quartile	0.98	1.18	-0.27
Household equivalent income			
Below first quartile	-0.82	0.01	0.29
Between first and second quartile	-0.15	-0.45	0.08
Between second and third quartile	0.24	-0.28	-0.13
More than fourth quartile	0.73	0.72	-0.24
Dynamics of household equivalent income in 2014-2016			
Increasing	-0.26	0.20	0.07
Stable	0.36	-0.20	-0.17
Decreasing	-0.03	-0.01	0.05
Dynamics of personal income in 2014-2016			
Increasing	-0.37	0.26	0.08
Stable	0.41	-0.27	-0.15
Decreasing	-0.05	0.02	0.06