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WELL-BEING EFFECTS OF THE DIGITAL PLATFORM ECONOMY: THE CASE OF TEMPORARY AND SELF-EMPLOYMENT

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Abstract. The increase in atypical jobs (self-employment and temporary jobs) driven by the digital platform economy (gig economy) has put this type of work in the spotlight of the social and political debate. Among the countries of the European Union, Spain stands out for having the highest volume of digital platform work. This study uses microdata from the Spanish Living Conditions Survey for the year 2018 and Google trends data on Deliveroo, Airbnb, Just Eat, Uber, and Freelance as a proxy of digital platform economy demand to analyse the well-being effects of being employed in any of the types of employment arrangements associated with the gig economy. Using an econometric approach based on instrumental variables, we find evidence that the most deleterious well-being effects are found among self-employed workers and for the dimension of well-being based on self-reported health. The self-employed (own-account workers) display a 125.8% decrease in average self-reported health levels compared to permanent workers. Our results suggest that the greater job insecurity and precariousness associated with self-employment outweighs the potential positive impact caused by the greater flexibility and autonomy of this type of work.

Keywords: Digital platform economy, Gig economy, Digital platform work, Self-employment, Temporary jobs, Well-being, Self-reported health, Happiness, Life satisfaction.

JEL Classification: I31, J21, J81, J40.

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Introduction

The emergence of the digital platform economy, also known as the ‘gig economy’, has been one of the most important transformations in the new world in the past decade (ILO, 2018). Although the number of gig workers is still relatively small (1-3% of the global workforce according to Schwellnus et al., 2019), it is estimated that digital platform work will continue to grow in the future and expand across sectors.

This economic revolution is causing a transformative and potentially severe impact on employment relationships, as it disrupts the general concept of ‘normal jobs’. In recent years, especially in the wake of the Great Recession, digital platforms have been fundamentally changing the contract between workers and companies. This has led to the emergence of the so-called gig or platform economy (De Stefano, 2016a; Stewart & Stanford, 2017), resulting in labour markets characterized by an increasing prevalence of non-standard work arrangements, especially temporary jobs and self-employment. While these non-traditional work arrangements have attracted wide attention from both scholars and the popular media for decades, the rapid emergence of platforms that use digital technologies to intermediate labour on a per-task basis has fuelled a resurgence of interest in how these types of work arrangements affect workers’ well-being. Insofar as these platforms create significant job opportunities, increase the just-in-time workforce, and provide temporal flexibility (De Stefano, 2016b; Wood et al., 2018), such forms of employment might increase the well-being of workers. In fact, the demand for greater flexibility and a better work-life balance constitutes some of the drivers behind the growth of platform work (European Commission, 2017; OECD, 2019). However, these work arrangements may erode labour protection, be prone to poorer working conditions, and sustain economic insecurity and the unpredictability of working life (Drahokoupil & Fabo, 2018; Kässi & Lehdonvirta, 2016). In such a case, lower levels of well-being may be observed among workers employed in this type of work arrangements.

Therefore, it is essential to understand how workers fare in these types of work arrangements associated to the gig economy (particularly temporary jobs and self-employment), which are becoming a prominent feature of 21st-century labour markets. The main purpose of this paper is to analyse the well-being of these workers in the Spanish labour market. Specifically, we examine the effect of this digital platform work on several dimensions of individual well-being: health, happiness, and different facets of satisfaction (general, financial and with work, personal relationships, and leisure time). To that end, we exploit microdata for the year 2018 from a specific module of the Spanish Living Conditions Survey; the Spanish sample of the European Union Statistics on Income and Living Conditions (EU-SILC).

We focus on Spain because it stands out among the EU countries with the highest volume of work through digital platforms. In particular, around 2.6% of the working population in Spain relies on digital platform work as their main form of employment (Pesole et al., 2018). This new labour model has placed the focus on the high job temporality and use of the ‘false self-employed’ formula. As regards self-employment, some studies have pointed out that in many cases these work arrangements have ceased to be a free choice for workers in Spain (Monereo, 2016). Many of the new self-employed (freelancers), especially after the 2008 crisis, have found jobs through digital platforms, as indicated in a report by GoVup and the Spanish Digital Economy Association (GOVUP & Adigital, 2017). Moreover, according to the International Labour Organization (ILO, 2016), to the extent that jobs linked to digital platforms consist of project or task-based contracts and are of fixed-term duration or seasonal, temporary employment has become

increasingly related to the digital platform economy. Since the beginning of the economic recovery in 2014, temporary hiring has become widespread in Spain, as noted by Felgueroso et al. (2017).

Our results indicate that self-employed workers have lower levels of individual well-being than other types of workers, especially in terms of self-reported health. Specifically, their average levels of self-reported health decrease by 125.8% with respect to permanent workers. In contrast to the greater flexibility and autonomy characterizing these types of atypical jobs predominant in the digital platform economy, these results suggest that aspects such as lack of job security, uncertainty, and social isolation exert a greater effect on workers' individual well-being.

The paper is organized as follows. Following the introduction, Section 1 reviews the most recent literature on the effects of the digital platform economy on the labour market. Section 2 describes the datasets and provides a descriptive analysis of the gig economy in Spain and its relation to individual well-being. Section 3 describes the empirical model and Section 4 discusses the results. Section 5 concludes.

1. Background: the digital platform economy and the labour market

The digital platform economy, or gig economy, is based on non-standard forms of employment (NSE, hereinafter) that are closer to “gigs” than traditional kinds of jobs (ILO, 2016). Over the past few decades, there has been a marked shift towards NSE in both industrialized and developing countries. Indeed, NSE has become a contemporary feature of labour markets around the world, as the use of such work arrangements has become more widespread across economic sectors and occupations. In 2013, NSE accounted for around a third of total employment in OECD countries (OECD, 2015). NSE relies heavily on temporary and part-time positions filled by independent contractors and freelancers rather than full-time and permanent employees.¹ Thus, the evolution of the digital platform economy is closely associated with these atypical forms of employment.

Temporary employment in which workers are engaged for a specific period of time includes fixed-term, project- or task-based contracts, as well as seasonal or casual work, or day labour. For decades, the Spanish labour market has been characterized by a high level of temporary employment, especially compared to the EU average. This has led to what is known as a dual labour market in which workers are hired on either fixed-term, temporary contracts, or regular, open-ended contracts. Although temporary employment decreased slightly during the years of the economic crisis² due to the widespread destruction of temporary jobs, following the economic recovery temporary employment increased again to account for 22.7% of all jobs in 2018. In 2021, this figure was even higher, with over 24% of the Spanish workforce employed on temporary work contracts; a much higher share relative to other OECD countries.³

Self-employment has also been considered NSE in several studies on industrialized countries (see, for example, OECD, 2015). In the Spanish labour market, self-employment also increased over the period 2012–2016 and has stabilized at 15-16% in recent years; a slightly higher figure than the European average.

¹ The classification of non-standard employment was the subject of discussion at the February 2015 ILO Meeting of Experts on Non-standard Forms of Employment (ILO, 2015).

² See Eurostat data (2000-2018): [Temporary employees](#)

³ [Employment - Temporary employment - OECD Data](#)

In principle, NSE can have both positive and negative aspects and hence affect workers in terms of their well-being. On the one hand, work arrangements associated to NSE might be valued and preferred by some workers who opt for this type of employment to achieve a better work-family balance and/or greater autonomy and sense of control in the case of self-employment. However, NSE might be associated with job insecurity and precariousness as well as poorer working conditions where non-standard workers are exempted from the same levels of employment protection, safeguards, and fringe benefits enjoyed by their counterparts in standard working arrangements.

As regards temporary employment, a large body of research has shown evidence of the negative impact of this type of work arrangement on subjective well-being (Klein & van Vuuren, 1999; Blanchard & Landier, 2002; Quesnel-Vallee et al., 2010; Robone et al., 2011; Carrieri et al., 2012; Dawson et al., 2017) and happiness (Scherer, 2009; Ponzo, 2011). However, some studies have reported a weak or non-negative impact of these work arrangements on workers' well-being (Sverke et al., 2000; Rodríguez, 2002; Bardasi & Francesconi, 2004; Silla, 2005; Cottini & Lucifora, 2013).

Research has also found that, overall, people who are self-employed exhibit consistently higher levels of subjective well-being measured either in terms of happiness or job satisfaction than those who are not self-employed (Blanchflower & Oswald, 1998; Blanchflower, 2000; Alesina et al., 2004; Andersson, 2008; Kawaguchi, 2008; Benz & Frey, 2008; Binder & Coad, 2013; Millan et al., 2013). In recent years, however, self-employed workers have become more heterogeneous. While for some the quality of work may be good and the continuity of work quite secure, for others this type of work arrangement has been increasingly associated with what has been called 'involuntary', 'dependent', and 'precarious' self-employment (Stone, 2006; Schulze et al., 2009; Kautonen et al., 2010; Westerveld, 2012; Eurofound, 2017).

This paper attempts to contribute to this literature by providing recent empirical evidence on the subjective well-being effects of temporary and self-employment; two non-standard forms of employment that have been closely associated with the emergence of the digital platform or gig economy in recent years.

2. Data

To achieve the objectives of the paper, we exploit data from several sources that include information on self-employment and temporary employment. In a first stage, we provide an overview of the incidence and evolution of temporary and self-employment for Spain and the EU-15 for the period 2000–2018 using aggregated data from the European Union Labour Force Survey (EU-LFS). Specifically, we analyse the incidence of self-employment and temporary work on total employment, attending to several individual and labour characteristics such as gender, educational level, age, and occupation.

The analysis of the relationship between self-employment, temporary employment, and the individual well-being of workers is based on cross-sectional microdata from the 2018 wave of the Spanish Living Conditions Survey (ECV-2018); the Spanish sample of the EU-SILC. The ECV-2018⁴ is well suited to achieve the purposes of this study as it includes

⁴ The ECV is conducted on a sample of around 13,000 households and involves approximately 35,000 individuals. Its aim is to collect timely and comparable data on income, poverty, social exclusion, and living conditions. Around 90% of the collected data comprises annual variables. The rest are

a special module with self-reported information on various dimensions of subjective well-being: self-reported health, happiness, life satisfaction, satisfaction with financial situation, job satisfaction, satisfaction with personal relationships, and satisfaction with leisure time. To complement the ECV-2018 microdata and following the proposal of Apouey and Stabile (2019), we use Google search data on the amount of search activity related to the gig economy. In particular, we use google trends data at the regional level (autonomous communities)⁵ on Deliveroo, Airbnb, Just Eat, Uber, and Freelance as a proxy of the digital platform economy demand to estimate the likelihood that an individual will be employed in a gig-type job (employee with a temporary contract or self-employed).

3. Descriptive analysis

3.1. Jobs related to the gig economy in Spain and in the EU-15

We start by providing an overview of the incidence and evolution of self-employment and temporary employment in Spain and in the EU-15 for the period 2000–2018 using aggregate data from the EU-LFS. In general terms, the analysis reveals that self-employment and temporary employment rates are higher in Spain than the rest of the EU-15 countries, especially in terms of temporality. In particular, the percentage of self-employed persons in Spain was 14.9% in 2018, while the figure for the rest of the EU-15 was 13%,⁶ while the temporary employment rate (measured over total employment) was 22.7% in Spain and 12.6% in the EU-15. As regards individual characteristics,⁷ self-employment is higher among men, while temporary employment is more frequent among women, for whom the gap with the rest of Europe is widening. There is also an inverse relationship with educational level, although this is more evident in the case of temporary jobs. While self-employment is more frequent among older workers, temporary employment is concentrated among young people.

As regards self-employment, Figure 1 shows that the incidence of this type of work is lower among workers with tertiary education in Spain than the European average, especially among women. This finding reflects that the tasks and occupations associated with these jobs in the rest of Europe are characterized by a higher level of qualification (e.g., in liberal professions). The data also suggest that European women with a higher education opt for more flexible forms of work that favour the work-family balance to a greater extent than Spanish women. Both in Spain and in Europe, the low frequency of self-employment among young people is noteworthy.

either modules that are collected every three or six years or modules conducted ad-hoc to respond to policy needs.

⁵ NUTS-2.

⁶ In terms of self-employed persons without employees (own-account workers) these figures were 10.4% for Spain and 9.1% for the rest of the EU-15.

⁷ See Figures A1 and A2 in the Appendix.

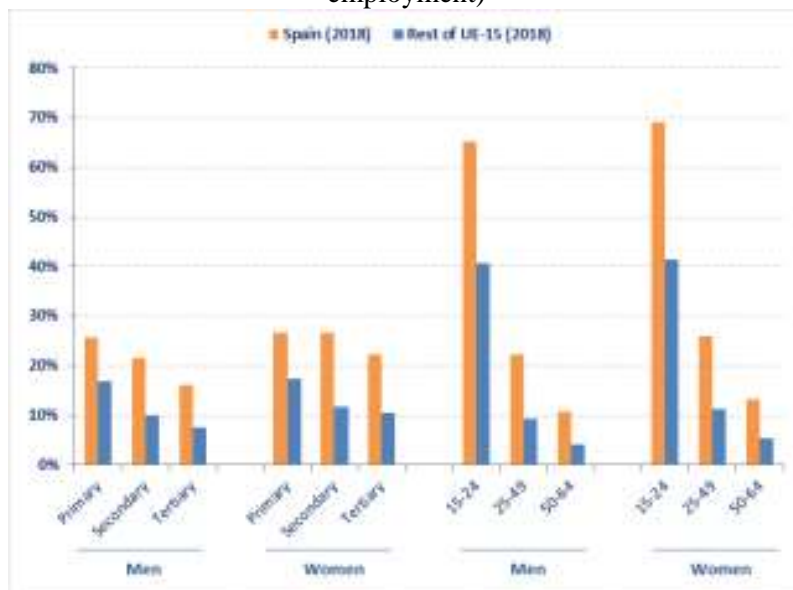
Figure 1. Self-employment in 2018 by gender, educational level, and age (% over total employment)



Source: Own elaboration based on data from the EU Labour Force Survey (Eurostat, 2018).

Figure 2 shows information on temporary employment. As can be seen, there is a higher prevalence of temporary employment in Spain compared to the rest of the EU-15 countries for all demographic groups. Moreover, the incidence of temporary employment is notably higher among women. A differential characteristic of Spain is that, unlike men, women with primary and secondary education display very similar figures of temporary work; values that are smaller only for women with tertiary education. In contrast, the relationship between job temporality and education is equivalent for men and women in the rest of Europe. These figures suggest that, unlike the rest of the EU-15, women in Spain require more years of education than men to achieve more stable jobs. Finally, there is a notable difference between Spain and the rest of the EU-15 (26 percentage points) regarding the incidence of temporary work among the youngest workers.

Figure 2. Temporary employment by gender, educational level, and age in 2018 (% over total employment)



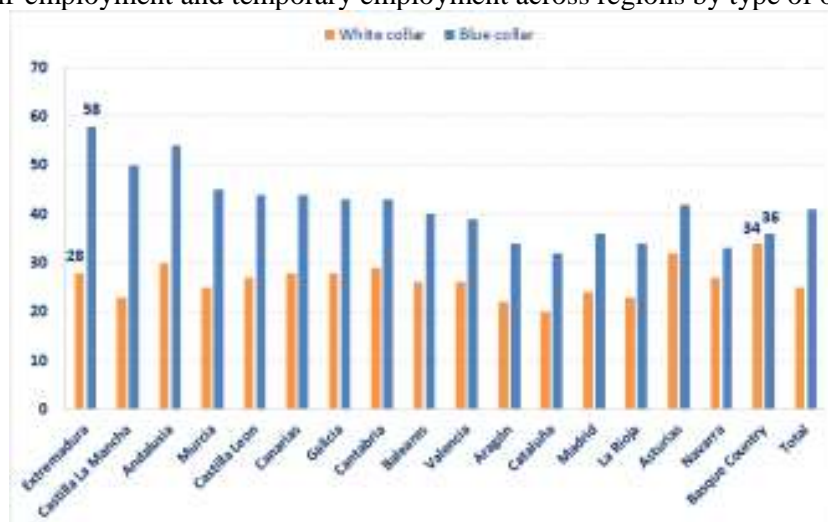
Source: Own elaboration based on data from the EU Labour Force Survey (Eurostat, 2018).

3.2. Employment status and individual subjective well-being

Our analysis of the effects of the digital platform economy or gig economy on individual subjective well-being is based on two subsamples of individuals aged 16–64 years drawn from the ECV-2018 microdata. The first subsample includes 11,377 employed individuals (employees with permanent contracts, employees with temporary contracts, and the self-employed). The second subsample also considers unemployed and inactive individuals, amounting to a total of 16,527 individuals.⁸ We will use the first sample to compare self-employed and temporary workers with respect to permanent workers in terms of well-being, while the second sample will allow us to make a comparative analysis also with respect to unemployed and inactive workers. It should be noted that self-employment refers exclusively to own-account workers, excluding self-employed persons with employees (employers).

In the full sample, 45.8% of individuals are permanent workers, 15.5% are unemployed, and 15.7% are inactive, while 23% were employed in one of the usual forms of employment in the gig economy (7.7% self-employment and 15.3% temporary employment). These forms of employment accounted for 33.5% of the sample of employed persons (22.2% temporary employees and 11.2% self-employed). Figure 3 displays information on self-employment and temporary employment across Spanish regions (autonomous communities) and type of occupation differentiating between white-collar and blue-collar occupations. As can be seen, in all regions, the incidence of the types of jobs linked to the gig economy is much lower among white-collar occupations (managerial, professional, technical, or administrative positions) than blue-collar occupations (skilled workers in the service, manufacturing, or construction sectors, operators, workers in elementary occupations). These differences are accentuated in some regions such as Extremadura, where the incidence of self-employment and temporary employment in blue-collar occupations is 58%; as well as in Castilla-La Mancha, Andalusia, and Murcia. In contrast, the Basque Country registers the smallest differences between the two types of occupations (36% in blue-collar occupations and 34% in white-collar occupations).

Figure 3. Self-employment and temporary employment across regions by type of occupation (%)



Notes: White-collar occupations (Directors and managers, Scientific technicians and professionals, Support technicians, Accountants and administrative staff). Blue-collar occupations (Service workers and salespersons, Skilled agricultural workers, Skilled artisans and skilled industrial and construction workers, Operators and assemblers, Elementary occupations). Armed forces occupations have not been included. Self-employed refers to own-account workers. Source: Own elaboration (ECV-2018).

⁸ Table A1 in the Appendix displays the sample characteristics of both samples.

Focusing on the relationship between the types of jobs linked to the digital platform economy and individual well-being, Table 1 provides a descriptive analysis of the different dimensions of subjective well-being according to individuals' employment status. For all dimensions, this is self-reported information. For the satisfaction variables, responses are recorded on a scale of 1 to 11 where 1 is "not at all satisfied" and 11 is "completely satisfied". For the self-reported health and happiness variables, the scale ranges from 1 (very bad) to 5 (very good). Numerous studies have shown that subjective well-being measures have a high predictive power for relevant phenomena and are related (in the expected direction) to a range of observable indicators such as physical health and longevity (Danner et al., 2001), suicide rates, macroeconomic fluctuations (Di Tella et al., 2004), or unemployment (Clark et al., 2008), among others. These self-reported measures also show reasonable consistency, as they correlate well with each other and with alternative measures based on information provided by family and friends and a wide range of psychological and psychosocial indicators (Cacioppo & Patrick, 2008).

As Table 1 shows, employed workers report higher levels of individual well-being than unemployed or inactive individuals except in leisure satisfaction. In general terms, well-being seems to be higher for employed workers with permanent contracts, especially in the dimension of financial satisfaction. Employed workers with a permanent contract report a mean score of 7.91 in financial satisfaction, which is 10% higher than the score reported by fixed-term employees and 4% higher than self-employed workers. To a lesser extent, permanent employees report a mean value of job satisfaction and life satisfaction that is 4% and 2% higher than fixed-term employees and self-employed workers, respectively. In contrast, no significant differences were found between self-employed and temporary workers in the mean values of the different well-being indicators, with the only exception being leisure satisfaction. Both permanent and fixed-term workers report much higher levels of satisfaction with leisure time than self-employed workers (around 8% higher).

Table 1. Main descriptives of well-being variables

	Permanent contracts		Temporary contracts		Self-employed (own-account workers)		Unemployed		Inactive	
	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Self-reported Health	4.12	0.65	4.15	0.68	4.04	0.68	3.88	0.81	3.60	0.99
Happiness	4.02	0.86	3.97	0.89	3.91	0.87	3.65	1.01	3.81	0.98
Life satisfaction	8.80	1.38	8.43	1.62	8.59	1.50	7.48	2.06	8.16	1.95
Financial satisfaction	7.91	1.74	7.22	1.99	7.60	1.77	5.72	2.43	7.18	2.19
Personal relationship satisfaction	9.32	1.38	9.28	1.39	9.29	1.33	9.08	1.61	9.18	1.59
Job satisfaction	8.41	1.72	8.05	1.93	8.26	1.85	-	-	-	-
Leisure satisfaction	7.42	2.18	7.41	2.18	6.88	2.50	8.02	2.17	8.33	2.08
N	7,570		2,528		1,279		2,560		2,590	

These data suggest that the type of contract exerts an effect on individual well-being. In the next section we aim to shed more light on the impact of these atypical working arrangements on individual well-being.

4. Empirical model and econometric strategy

To analyse the impact of self-employment and temporary work on individual well-being, we employ the following specification:

$$SWB_{ij} = \alpha + \beta LMS_{ij} + \gamma X_{ij} + \delta Y_j + \epsilon_{ij} \quad (1)$$

where SWB_{ij} represents the subjective well-being of individual i who lives in region j . As mentioned, we consider seven dimensions of well-being: self-reported health, happiness, life satisfaction, satisfaction with financial situation, job satisfaction, satisfaction with personal relationships, and satisfaction with leisure time. For the estimation of equation (1), the different SWB measures are considered to encompass a cardinality-type classification. While the assumption of cardinality rather than ordinality is not relevant for the results (Ferrer-i-Carbonell & Frijters, 2004), it has the advantage of producing coefficients that can be directly interpreted as marginal effects.

LMS_{ij} is a vector that includes several dummy variables related to the employment situation of individual i in region j . Specifically, for the analysis of the subsample of employed persons, the vector LMS_{ij} includes the dummy variable GIG_Emp (which takes the value of 1 if the person is self-employed or is on a temporary contract). In addition, for the analysis of the total sample of individuals (employed, unemployed, and inactive) the vector LMS_{ij} includes the dummy variables $Unemployed$ and $Inactive$, which take the value of 1 if the individual is unemployed or inactive, respectively. For both samples, the reference category in the estimations is *Permanent* (being employed with a permanent contract). Moreover, to explore in greater depth which types of contractual arrangements closely linked to the gig economy may lead to lower levels of well-being, we consider the self-employed (*Self-Employed*) and temporary employees (*Temporary_Employed*) separately.

Vector X_{ij} includes several socio-demographic characteristics at the individual and household levels. The individual characteristics include gender, age, marital status, and level of education, and the household characteristics are total household size, number of children, household income, and an indicator of whether the household has difficulties in making ends meet. This vector also includes a dummy variable that distinguishes between blue-collar⁹ and white-collar occupations. Finally, vector Y_j includes the average income and unemployment rate at regional level.

Our empirical strategy starts with the estimation of equation (1) by ordinary least squares (OLS) for both subsamples (employed individuals and total sample). In the first model (OLS-1) we have jointly considered self-employed and temporary workers under the category GIG_Emp , while the second model (OLS-2) considers both types of employment arrangements separately in the estimations (*Self_employed* and *Temporary_Emp*).

An inherent problem in determining the sign of the causal effect that the type of work most closely related to the digital platform economy may have on individual well-being is the possibility of a reverse causality and selection problem. In other words, levels of individual well-being might affect the probability that an individual is self-employed or a temporary employee. Moreover, other unobservable factors may affect both the likelihood of being employed in a gig-economy job and individual well-being. To address these problems,

⁹ Based on major groups 5 to 9 of the ISCO-2008 (Service workers and salespersons, Skilled agricultural workers, Skilled artisans and skilled industrial and construction workers, Operators and assemblers, Elementary occupations). Armed forces are excluded from the analysis.

and in line with previous work (Apouey & Stabile, 2019; Berger et al., 2019), equation (1) is also estimated using an instrumental variables methodology (IV).

Following Apouey and Stabile (2019), we use Google Trends data at the regional level (autonomous communities) for the year 2018 corresponding to the number of Google searches for different digital platforms related to the gig economy (Deliveroo, Airbnb, Just Eat, Uber, and Freelance). We use these google trends data as a proxy variable for the gig economy demand and hence as an instrument to estimate the probability that an individual is employed in one of the two contractual arrangements most closely related to the gig economy (self-employment or temporary job). These web search data are increasingly being used as measures of economic activity or indicators of the demand in this type of digital platform economy, which also make it possible to obtain predictions on the evolution of unemployment among other macroeconomic variables (see, e.g., D’Amuri & Marcucci, 2010).

More precisely, using a sample of searches, Google Trends provides the percentage of a region’s searches for a given word divided by the percentage of searches on a given word in that region with the highest share of searches for that same word multiplied by 100. The resulting data is therefore relative to the region with the highest share of searches at time t equal to 100.

Specifically, for region j at time t the score for the word “ W ” is defined as follows:

$$\text{Search_}W_{j,t} = \frac{\left[\frac{\text{Google searches that include the word "W"}}{\text{Total Google searches}} \right]_{j,t}}{\left[\frac{\text{Google searches that include the word "W"}}{\text{Total google searches}} \right]_{j_{\max},t}} \times 100$$

5. Results

Table 2 and Table 3 display the results for the sample of employed individuals and the full sample for the OLS and IV regressions, respectively. Since we find evidence of endogeneity in all the estimates,¹⁰ not controlling for the reverse causality problem (OLS-1 and OLS-2) would result in misleading conclusions. Hence, our comments will be based on models IV-1 and IV-2 where we control for possible sources of endogeneity and self-selection.

Starting with the sample of employed individuals (Table 2), the results indicate that jointly considering the types of jobs most closely linked to the digital platform economy significantly reduces almost all the dimensions of individual well-being (Table 2, Model IV-1). The largest and most highly significant effect appears in the dimension of life satisfaction (the coefficient is -2.994), followed by self-reported health. The lowest effect occurs in the leisure dimension. Additionally, when considering self-employment and temporary employment separately (Table 2, Model IV-2), we find that the negative impact on well-being is mostly caused by self-employment. This is an interesting issue, since when we do not control for the reverse causality problem (OLS-2), we obtain the false result that temporary jobs are associated with the lowest levels of well-being, while the self-employed show only slightly lower levels of well-being than permanent employees. However, a completely different picture emerges when a methodological approach that allows controlling for the reverse causality problem is applied. In this case, we find that self-

¹⁰ The endogeneity test of endogenous regressors is significant at the 1% level in all estimates.

employed workers display the worst results in practically all the well-being dimensions analysed (Model IV-2), while temporary workers do not exhibit significantly lower levels of well-being than their counterparts in permanent jobs. However, it is worth noticing that being employed in a temporary job increases individual well-being in the dimension of satisfaction with personal relationships.

Table 2. Effects of the gig economy on individual well-being (employed workers). Main results

	Self-reported health				Happiness			
	OLS-1 ^(a)	OLS-2 ^(b)	IV-1 ^(a)	IV-2 ^(b)	OLS-1 ^(a)	OLS-2 ^(b)	IV-1 ^(a)	IV-2 ^(b)
GIG_Emp	-0.036*	-	-2.326***	-	-0.074***	-	-2.011***	-
	[0.017]		[0.506]		[0.018]		[0.483]	
Self_employed		-0.027		-5.182***		-0.075**		-2.899**
		[0.024]		[1.337]		[0.027]		[0.941]
Temporary_Emp		-0.041*		-0.621		-0.074***		-0.059
		[0.020]		[0.679]		[0.022]		[0.478]
	Life satisfaction				Financial satisfaction			
GIG_Emp	-0.113***	-	-2.994***	-	-0.101***	-	-1.798***	-
	[0.019]		[0.608]		[0.017]		[0.426]	
Self_employed		-0.038		-6.870***		-0.023		-5.042***
		[0.027]		[1.773]		[0.024]		[1.408]
Temporary_Emp		-0.157***		0.278		-0.147***		0.859
		[0.022]		[0.901]		[0.020]		[0.715]
	Personal relationships satisfaction				Leisure satisfaction			
GIG_Emp	-0.031	-	-1.376**	-	-0.060**	-	-1.353**	-
	[0.020]		[0.436]		[0.020]		[0.434]	
Self_employed		0.005		-4.448**		-0.166***		-3.035**
		[0.028]		[1.441]		[0.031]		[0.982]
Temporary_Emp		-0.052*		1.671*		0.003		-0.858+
		[0.023]		[0.732]		[0.023]		[0.499]
	Job satisfaction							
GIG_Emp	-0.079***	-	-1.396**	-				
	[0.020]		[0.441]					
Self_employed		0.006		-3.787**				
		[0.030]		[1.155]				
Temporary_Emp		-0.129***		-0.065				
		[0.024]		[0.587]				
N	11,377	11,377	11,377	11,377	11,377	11,377	11,377	11,377

Note: Standard errors in brackets. + $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

(a) Self-employment and temporary employment are jointly considered in the variable *Gig*; (b) Self-employment and temporary employment appear separately. Self-employed refers to own-account workers.

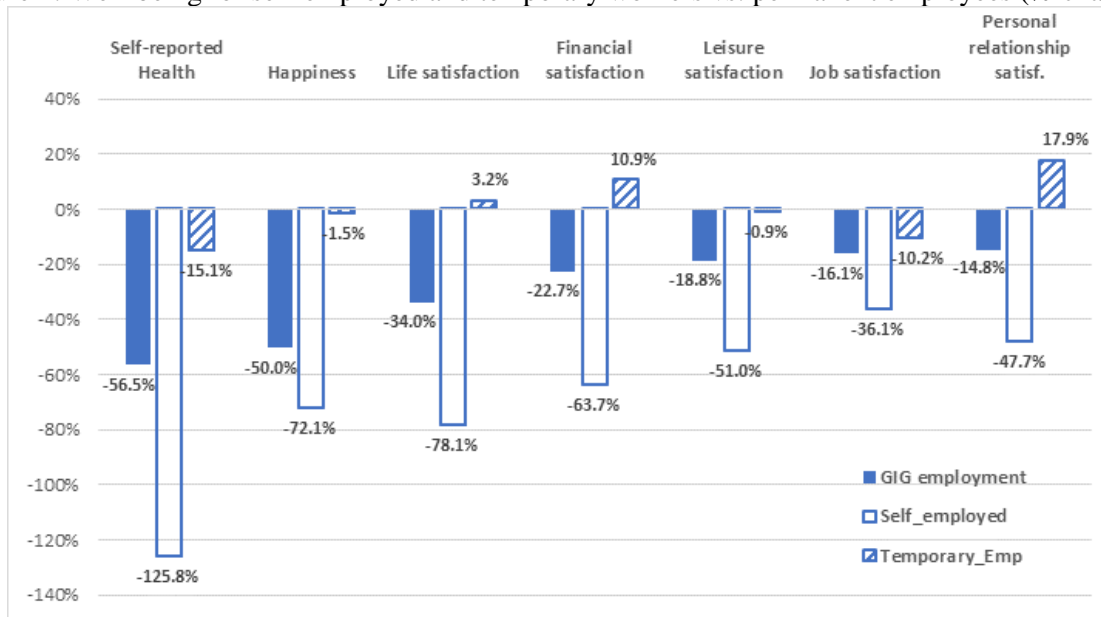
Controls: gender, age, educational level, marital status, number of children, household size, household income, household with difficulties to make ends meet, white/blue collar, regional unemployment rate, regional mean income.

Instruments: Google trends data on Just Eat, Uber, and Airbnb for Model IV-1. Just Eat, Uber, Airbnb, and population size for IV-2. Alternative estimates were made with different combinations including the number of Deliveroo and Freelance searches and finally the number of Just Eat, Uber, and Airbnb searches was chosen as the best instruments. Results not included but available upon request.

As regards the size of the effect, in Figure 4 we plot the percentage of reduction in the different dimensions of well-being for types of employment related to the gig economy

compared to the corresponding levels among permanent workers (reference category).¹¹ We sort the dimensions of well-being from the smallest to the largest effect. Compared to permanent workers, gig-economy workers display a 56.5% decrease in their average self-reported health levels. This percentage increases to 125.8% in the case of self-employment. For the other dimensions of well-being, the impact of being employed in one of the types of work associated with the gig economy is more moderate, but the lowest effect for self-employment is found for job satisfaction, with a 36.1% decrease (a non-negligible effect). In our data, the negative impact on well-being is due only to self-employment. This is a novel result since most of the literature has found that greater flexibility and autonomy in self-employment usually has a positive effect on well-being. Our conclusions point in the opposite direction and we find evidence of changes in the use of self-employment in the recent decades, as we highlighted in the introduction.

Figure 4. Well-being for self-employed and temporary workers vs. permanent employees (% change)



Notes: The reduction in well-being is computed by dividing the corresponding coefficients for gig employment, self-employed and temporary employees from the estimations of models IV-1 and IV-2 (Table 2, sample of employed workers) between the mean value of each well-being indicator for permanent employees (reference category; see column 2 in Table 1).

Coefficients of temporary employment are only statistically significant for the dimension of personal relationships (see Table 2, Model IV-2). Self-employed refers to own-account workers.

Source: Own elaboration (ECV-2018 and Google trends data on Just Eat, Uber, and Airbnb).

These negative effects on well-being are maintained and slightly magnified when the analysis also includes unemployed and inactive individuals (Table 3). The most detrimental well-being effects are observed again in the dimensions of life satisfaction, followed by happiness and self-reported health (coefficients in Model IV-1). When we consider different types of labour market status, we find that self-employed workers again suffer the largest

¹¹ The reduction in well-being is computed by dividing the corresponding coefficients for gig employment, self-employment, and temporary employment from the estimations of models IV-1 and IV-2 (Table 2) by the mean value of each well-being indicator for permanent employees (column 2 in Table 1). For instance, the 56.5% decrease is the result of dividing the coefficient of gig employment in the self-reported health dimension (Model IV-1) by the mean value of self-reported health among permanent employees (-2.326/4.12).

negative effect with respect to permanent employees, followed by unemployed and inactive individuals (Model IV-2 in Table 3). In contrast, temporary employment does not have a significant negative effect on individual well-being, and its positive influence on the dimension of satisfaction with personal relationships remains.

Table 3. Effects of the gig economy on individual well-being (Total sample). Main results

	Self-reported health				Happiness			
	OLS-1 ^(a)	OLS-2 ^(b)	IV-1 ^(a)	IV-2 ^(b)	OLS-1 ^(a)	OLS-2 ^(b)	IV-1 ^(a)	IV-2 ^(b)
GIG_Emp	-0.051** [0.016]	-	-3.439*** [0.814]	-	-0.070*** [0.018]	-	-3.624*** [0.862]	-
Self_employed		-0.021 [0.024]		-6.850*** [1.837]		-0.076** [0.026]		-5.492*** [1.577]
Temporary_Emp		-0.067*** [0.019]		-0.785 [0.962]		-0.067** [0.021]		-0.262 [0.826]
Unemployed	-0.171*** [0.021]	-0.172*** [0.021]	-1.608*** [0.347]	-1.251*** [0.360]	-0.232*** [0.023]	-0.232*** [0.023]	-1.740*** [0.368]	-0.976** [0.309]
Inactive	-0.415*** [0.023]	-0.415*** [0.023]	-1.701*** [0.311]	-1.446*** [0.327]	-0.108*** [0.023]	-0.108*** [0.023]	-1.457*** [0.329]	-0.829** [0.281]
	Life satisfaction				Financial satisfaction			
GIG_Emp	-0.117*** [0.018]	-	-5.167*** [1.130]	-	-0.110*** [0.016]	-	-2.786*** [0.688]	-
Self_employed		-0.041 [0.026]		-11.116*** [2.940]		-0.041+ [0.023]		-6.819*** [1.921]
Temporary_Emp		-0.159*** [0.022]		0.752 [1.539]		-0.149*** [0.019]		0.861 [1.006]
Unemployed	-0.459*** [0.024]	-0.462*** [0.024]	-2.602*** [0.482]	-1.594** [0.576]	-0.496*** [0.021]	-0.499*** [0.021]	-1.631*** [0.293]	-1.057** [0.377]
Inactive	-0.178*** [0.024]	-0.179*** [0.024]	-2.095*** [0.432]	-1.320* [0.524]	-0.103*** [0.020]	-0.105*** [0.020]	-1.119*** [0.263]	-0.687* [0.342]
	Personal relationships satisfaction				Leisure satisfaction			
GIG_Emp	-0.027 [0.019]	-	-2.345*** [0.690]	-	-0.058** [0.020]	-	-1.958** [0.634]	-
Self_employed		0.011 [0.028]		-6.647** [2.193]		-0.181*** [0.031]		-4.810*** [1.438]
Temporary_Emp		-0.048* [0.022]		2.693* [1.148]		0.01 [0.022]		-0.655 [0.753]
Unemployed	-0.064** [0.024]	-0.065** [0.024]	-1.048*** [0.294]	-0.093 [0.430]	0.394*** [0.024]	0.399*** [0.024]	-0.412 [0.270]	-0.385 [0.282]
Inactive	-0.028 [0.024]	-0.029 [0.024]	-0.908*** [0.264]	-0.154 [0.391]	0.449*** [0.024]	0.451*** [0.024]	-0.272 [0.242]	-0.293 [0.256]
N	16,527	16,527	16,527	16,527	16,527	16,527	16,527	16,527

Note: Standard errors in brackets. + $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

(a) Self-employment and temporary employment are jointly considered in the variable *Gig*; (b) Self-employment and temporary employment appear separately. Self-employed refers to own-account workers.

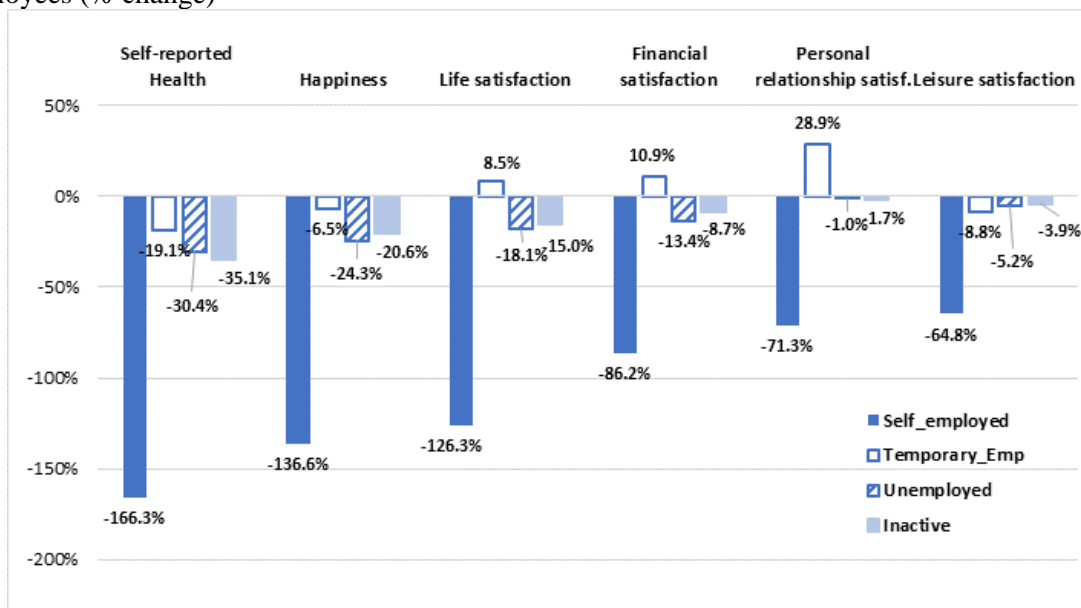
Controls: gender, age, educational level, marital status, number of children, household size, household income, household with difficulties to make ends meet, white/blue collar, regional unemployment rate, regional mean income.

Instruments: Google trends data on Just Eat, Uber, and Airbnb for Model IV-1. Just Eat, Uber, Airbnb, and population size for Model IV-2. Alternative estimates were made with different combinations including the number of Deliveroo and Freelance searches and finally the number of Just Eat, Uber, and Airbnb searches was chosen as the best instruments. Results not included but available upon request.

The negative impact of self-employment on well-being could partly be due to the fact that during the Great recession that began in 2008, many workers were “forced” to choose this type of non-standard employment as the only way to avoid unemployment, even though it was not the most desirable option for many of them. Hence, the greater insecurity and precariousness associated with self-employment would outweigh the potential positive impact of the greater flexibility and autonomy characteristic of this type of work.

In a similar vein, Figure 5 shows the percentage of reduction¹² in the different dimensions of well-being for the self-employed, temporary workers, the unemployed, and inactive individuals compared to the corresponding levels among permanent employees (reference category). The smallest impact is observed in the dimension of leisure satisfaction. In this well-being dimension, being self-employed leads to a 64.8% reduction in average satisfaction levels. In contrast, the largest effect appears in self-reported health where the well-being of self-employed workers decreases by 166.3% compared to permanent employees. The detrimental effects of being unemployed or inactive on well-being range from 1% (personal relationships) to 30.4% (self-reported health) in the case of unemployed workers, and from 1.7% (personal relationships) to 35.1% (self-reported health) in the case of inactive individuals. Although not significantly different from zero in almost all the well-being dimensions, temporary employment seems to increase levels of well-being in the dimension of personal relationships by 28.9% with respect to permanent workers.

Figure 5. Well-being for self-employed, temporary workers, unemployed and inactive vs. permanent employees (% change)



Notes: The reduction in well-being is computed by dividing the corresponding coefficients for self-employed, temporary employment, unemployment, and inactivity from estimations for Model IV-2 (Table 3, total sample) between the mean value of each well-being indicator for permanent employees (reference category; see second column in Table 1). Coefficients of temporary employment are only statistically significant in the personal relationships dimension (Table 3, Model IV-2). Self-employed refers to own-account workers.

Source: Own elaboration (ECV-2018 and Google trends data on Just Eat, Uber, and Airbnb).

¹² The decrease in well-being is computed by dividing the corresponding coefficients for gig employment, self-employed, temporary employment, unemployment and inactivity from the estimations of models IV-1 and IV-2 (Table 3, total sample) by the mean value of each well-being indicator for permanent employees (see column 2 in Table 1).

Overall, our results highlight the importance of correcting for the endogeneity of self-employment and temporary employment when analysing the influence of these types of jobs on individual well-being. To check the validity of the instruments, Table 4 displays the underidentification and overidentification tests, Anderson canon correlation LM statistic, and Sargan statistic using as instruments the number of Google searches for “Just Eat”, “Uber” and “Airbnb” (for Model IV-1) plus the regional¹³ population size for Model IV-2. In almost all estimates, both tests lead us to reject the hypothesis of weak instruments, hence confirming the validity of the Google Trends data linked to the digital platform economy as instruments.

Table 4. Underidentification test and overidentification test of all instruments in Instrumental variables estimates

	Employed workers		Total sample	
	Sargan statistic (overidentification test of all instruments):			
	IV-1 (a)	IV-2 (b)	IV-1 (a)	IV-2 (b)
Self-reported health	13.864 ***	1.622	6.764 *	0.284
Happiness	8.072 *	22.828 ***	4.295	12.605 **
Life satisfaction	16.694 ***	4.975 +	18.515 ***	7.037 *
Financial satisfaction	10.832 **	0.506	10.217 **	0.806
Job satisfaction	19.279 ***	4.769 +	-	-
Personal relationships satisf.	7.692 *	4.094	6.764 *	6.641 *
Leisure satisfaction	11.892 **	5.1 +	12.3 **	1.87
	Underidentification test (Anderson canon. corr. LM statistic)			
	IV-1 (a)	IV-2 (b)	IV-1 (a)	IV-2 (b)
	32.583 ***	16.453 ***	24.453 ***	15.432 **

+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Conclusions

In this paper we have analysed the effects of being employed in one of the types of jobs most related to the digital platform or gig economy on several dimensions of individual well-being in Spain for 2018. Spain is among the EU countries with the highest volume of digital platform work. The results confirm a higher incidence of self-employment and especially temporary employment in Spain compared to the rest of the EU-15 during the period 2000–2018.

According to our data, the self-employed have lower levels of individual well-being than the rest of workers, with the greatest negative impact on self-reported health, which shows a decrease with respect to permanent workers equivalent to 125.8% of their average levels of self-reported health. Our results also underline the relevance of correcting for the endogeneity of self-employment and temporary employment. Once we control for the reverse causality problem using Google trends data as instruments of digital platform economy demand, temporary workers do not exhibit significantly lower levels of well-being than their counterparts in permanent jobs. Thus, we can conclude that the negative impact on well-being is mostly caused by self-employment (own-account workers).

Our estimates suggest that the negative impact on well-being caused by aspects such as job insecurity and precariousness associated with self-employment would outweigh the

¹³ Spanish Autonomous Communities (NUTS2). Figures referred to 2018.

potential positive impact caused by the greater flexibility and autonomy of this type of work. Thus, our results would be in line with previous works in the literature suggesting that feelings of job insecurity and the stressful conditions associated with types of jobs linked to the digital platform economy produce overall unfavourable outcomes (Cheng & Chan, 2008; De Witte, 1999, 2005; Probst, 2008; Sverke et al., 2002). However, in our estimations we do not find evidence that temporary employment produces negative effects on individual well-being. These findings indicate that the profile of self-employed workers has changed since the Great Recession of 2008–2013, as nowadays self-employment is no longer a voluntary decision between being an employee or self-employed but rather the result of the only opportunity for employment in a strongly deteriorated labour market.

Some limitations should be mentioned. To date, there is no standard measure that allows determining the true incidence of the digital platform economy in society because existing data sources have problems capturing workers engaged in “gig jobs”. In this sense, the only relevant progress is the Online Labour Index¹⁴ which measures the use of digital platforms in real time for all countries and occupations.

Additionally, it should be noted that while self-employment and temporary employment are closely linked to the digital platform economy, they cannot be considered a fully accurate measure of gig jobs, which means that the results of this study should be taken with some caution. In this sense, more precise and higher quality data on the professionals working on and for digital platforms and hence on the incidence of the digital platform economy would be necessary to analyse its impact on society. This could be achieved, for example, by means of a register kept by the platforms themselves that would make it possible to obtain a census with detailed information on these workers. In addition, it would be very useful to be able to monitor workers in this type of non-standard jobs (e.g., through longitudinal databases) in order to correct the usual potential biases arising from both the self-selection of individuals in these jobs and the existence of unobservable factors that may simultaneously affect employment decisions and other types of individual decisions or situations; topics of study that could be of interest to researchers.

¹⁴ See Kässi & Lehdonvirta (2018).

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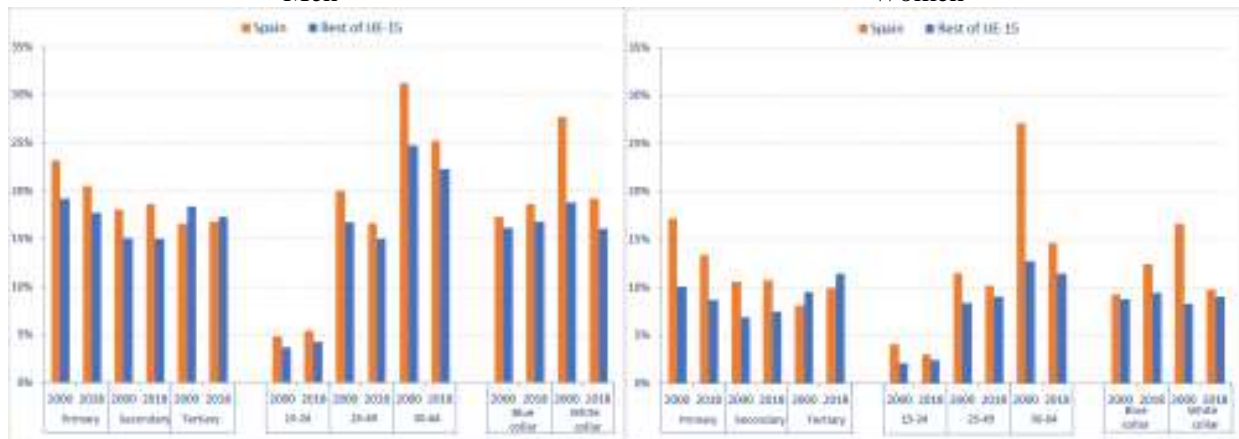
Appendix

Table A1. Sample characteristics

	Employed individuals (N = 11,377)				Total sample (N = 16,527)			
	Mean	SD	Min	Max	Mean	SD	Min	Max
Permanent workers	0.665	0.472	0	1	0.458	0.498	0	1
Temporary workers	0.222	0.416	0	1	0.153	0.360	0	1
Self-employed (own-account workers)	0.112	0.316	0	1	0.077	0.267	0	1
Unemployed	-	-	0	0	0.155	0.362	0	1
Inactive	-	-	0	0	0.157	0.364	0	1
Number of children	0.632	0.861	0	5	0.563	0.840	0	5
Ln (Household size)	1.385	0.306	0.693	2.485	1.374	0.310	0.693	2.639
Ln (Household income)	9.718	0.650	0.693	11.893	9.564	0.926	0.336	12.007
Household with difficulties to make ends meet	0.483	0.500	0	1	0.542	0.498	0	1
Female	0.472	0.499	0	1	0.504	0.500	0	1
Married	0.596	0.491	0	1	0.579	0.494	0	1
Divorced	0.076	0.264	0	1	0.078	0.269	0	1
Widowed	0.011	0.105	0	1	0.018	0.132	0	1
16-24 years	0.038	0.192	0	1	0.056	0.230	0	1
25-34	0.158	0.364	0	1	0.147	0.354	0	1
35-44	0.286	0.452	0	1	0.244	0.430	0	1
45-54	0.308	0.462	0	1	0.283	0.450	0	1
55-64	0.210	0.407	0	1	0.270	0.444	0	1
Primary education	0.063	0.243	0	1	0.102	0.303	0	1
Lower secondary	0.248	0.432	0	1	0.279	0.448	0	1
Upper secondary	0.243	0.429	0	1	0.244	0.430	0	1
Tertiary	0.447	0.497	0	1	0.375	0.484	0	1
Ln (Unemployment rate)	2.603	0.263	2.300	3.163	2.628	0.276	2.300	3.163
Ln (Regional income)	10.268	0.144	9.953	10.465	10.256	0.147	9.953	10.465
Blue collar occupation	0.535	0.499	0	1	0.597	0.490	0	1

Source: Own elaboration (ECV-2018).

Figure A1. Self-employment by personal characteristics (% over total employment): 2000-2018



Source: Own elaboration (European Labour Force Survey, Eurostat). Population aged 15-64 years.

Figure A2. Temporary employment by personal characteristics (% over total employment): 2000-2018



Source: Own elaboration (European Labour Force Survey, Eurostat). Population aged 15-64 years.

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