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Solo Self-employment and Wellbeing: An Overview of the Literature and an Empirical Illustration

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Abstract: The present paper focuses on wellbeing levels of solo self-employed individuals. Although the wellbeing of self-employed workers has been addressed in various earlier studies, studies on the relationship between *solo* self-employment and wellbeing are rare. We provide an overview of the literature on self-employment and solo self-employment in relation to wellbeing. Moreover, we provide an empirical illustration using Australian longitudinal data showing, among others, that the solo self-employed are significantly more satisfied with leisure time but less satisfied with their income, compared to both wageworkers and employer entrepreneurs.

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1. Introduction

Solo self-employment – self-employed individuals who do not employ others – has become an increasingly popular career choice. Solo self-employment, rather than self-employment with employees, is usually the dominant form of self-employment (Lechmann and Wunder, 2017). In almost all countries under investigation in Van Stel, Wennekers, and Scholman (2014), more than 50% of the self-employed works without employees. Also, the number of solo self-employed individuals as a fraction of the total labor force has increased in many countries. For example, the non-agricultural solo self-employment rate rose from 5.9% in 2000 to 7.8% in 2014 in the European Union (Van Stel and Van der Zwan, 2019). Moreover, among older age groups the prevalence of solo self-

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employment has increased, because solo self-employment is increasingly used as a transitory employment state between wagework and retirement (Damman and Van Solinge, 2018).

Given these increases in solo self-employment rates and the large numbers of individuals being in solo self-employment, research has started to focus on whether the choice for (solo) self-employment is a positive one (Binder, 2018). Indeed, it has been questioned whether the increase in solo self-employment can be understood as a desirable or a less favorable development (Burke, 2015). One way of approaching this is by focusing on the level of educational attainment among solo self-employed workers, proxying entrepreneurial ability or quality. Van Stel and Van der Zwan (2019) conclude that the growth of solo self-employment can be largely attributed to an increase in the number of highly-educated individuals.

Another way to approach this is to focus on the outcome side of entrepreneurial activity. That is, the developments as outlined above have led to research on the wellbeing levels of (solo) self-employed individuals. The link between self-employment and entrepreneurship on the one hand and life satisfaction on the other hand, has become a much-researched phenomenon (Wolfe and Patel, 2018). This can be understood from the observation that many people seem to strive for high levels of wellbeing (Frey and Stutzer, 2010). Also, it has been demonstrated that life satisfaction, being a component of an individual's wellbeing, is a predictor of several positive performance outcomes (Lyubomirsky, King, and Diener, 2005), such as productivity at work (Oswald, Proto, and Sgroi, 2015).

In this paper, we focus on the wellbeing levels of solo self-employed individuals. With wellbeing we mostly refer to subjective wellbeing (Diener, 1984) or happiness. Both terms capture an individual's subjective enjoyment with life and are usually measured by an individual's evaluation about his or her life (Veenhoven, 2012). Overall subjective wellbeing or happiness can therefore be defined as "*the degree to which an individual judges the overall quality of his/her own life-as-a-whole favorably*" (Veenhoven, 2012, p. 66). In the happiness literature one distinguishes between satisfaction with life-as-a-whole and satisfaction with certain life aspects including work, leisure time, health or income. Such satisfaction levels with life aspects are usually referred to as domain satisfactions (Erdogan et al., 2012). The incorporation of these life domains is consistent with the "bottom-up approach" that views overall life satisfaction as a function of satisfaction with life domains (Binder and Coad, 2016).

In terms of measuring happiness, one usually resorts to a measure of life satisfaction such as "*All things considered, how satisfied are you with your life? Pick a number between 0 and 10 to indicate how satisfied you are*". This measure will also be used in the present paper to reflect an individual's satisfaction with his/her life. A similar life satisfaction measure is "*How satisfied are you with the life you lead? Very satisfied, fairly satisfied, not very satisfied,*

or not at all satisfied?", which is included in the questionnaires of the Eurobarometer surveys. Information about satisfaction with life domains can be retrieved in a similar way by replacing "life" with "work", "leisure time", "health", "income", et cetera. In some studies the Satisfaction With Life Scale is used to measure life satisfaction (Diener, 1984).[2]

The present paper contributes to the literature in two ways. First, research so far has yet to provide an overview of how solo self-employment and wellbeing are linked, despite the large and increasing prevalence of solo self-employed individuals in society. Second, we provide an empirical illustration of the relationship between solo self-employment and wellbeing, making use of Australian longitudinal data. We focus on an overall measure of subjective wellbeing – satisfaction with one's life – and on several subdomains of life satisfaction, that is, satisfaction with work, leisure time, income, and health. Also, a self-assessment measure of health is used, together with a mental health measure.

The outline of this paper is as follows. First, we present an overview of the current state of knowledge about the relationship between self-employment and wellbeing. In the subsequent section we address the importance of investigating the heterogeneity within the group of self-employed workers in wellbeing research. Then, we zoom in on solo self-employment and present evidence on their wellbeing levels in terms of life satisfaction and several domain satisfactions. Basically, we compare the wellbeing levels of the solo self-employed with those of the wageworkers and the self-employed with employees (the employer entrepreneurs). Subsequently, we perform an empirical exercise on the wellbeing levels of solo self-employed individuals by using longitudinal data from Australia containing information about a wide range of wellbeing indicators. Again, the wellbeing levels of solo self-employed individuals are compared with those of wageworkers and employer entrepreneurs. The final section concludes and provides several avenues for future research.

2. Previous Findings on Self-Employment and Wellbeing

Much research has focused on the self-employed's satisfaction with their work. There is clear consensus that the self-employed derive significantly more satisfaction from their work than wageworkers (Benz and Frey, 2004, 2008a; Bianchi, 2012; Blanchflower, 2000; Blanchflower and Oswald, 1998; Hundley, 2001; Millán et al., 2013). The work satisfaction premium for self-employed workers has been found in a large set of countries (Benz and Frey, 2008b). The higher work satisfaction levels among the self-employed are explained by the higher "procedural utility" that they derive from their work, that is, individuals

[2] The Satisfaction with Life Scale consists of the following items: "*In most ways my life is close to my ideal*", "*The conditions of my life are excellent*", "*I am satisfied with my life*", "*So far I have gotten the important things I want in life*", and "*If I could live my life over, I would change almost nothing*."

value the procedures that lead to the outcomes (Frey, Benz, and Stutzer, 2004; Block and Koellinger, 2009). This procedural utility can for example be derived from high levels of autonomy, which is something that distinguishes self-employment from wagework (Benz and Frey, 2008a; Hundley, 2001). Also, the fact that the jobs of the self-employed are considered interesting plays a role, and hence "doing what you like to do" provides non-pecuniary benefits, which leads to higher levels of procedural utility and work satisfaction (Benz and Frey, 2008a; 2008b). Other procedural aspects include the use of initiative (Benz and Frey, 2008a), work schedule flexibility, skill utilization, and task variety (Hundley, 2001). The jobs of the self-employed score high on such procedural aspects.

To investigate whether the work satisfaction premium among the self-employed also extends to life satisfaction several authors have focused on the relationship between self-employment and life satisfaction. The results for life satisfaction are less consistent than for work satisfaction. There are several studies that find higher levels of life satisfaction for the self-employed than for wageworkers (Blanchflower and Oswald, 1998; Alesina et al., 2004; Andersson 2008; Stephan and Roesler, 2010). Other studies find no significant difference in life satisfaction between the self-employed and wageworkers (Di Tella et al., 2003; Aguilar et al., 2013), while a significant negative relationship between self-employment and life satisfaction has also been found (Graham and Felton, 2006; Salinas-Jiménez et al., 2013).

In a recent contribution Larsson and Thulin (2018) find – based on a cross-country analysis including 70 countries – that entrepreneurs have significantly higher levels of subjective well-being than wageworkers. The authors measure entrepreneurship with Total Early-Stage Entrepreneurial Activity (TEA), which is derived from the Global Entrepreneurship Monitor, a worldwide data collection initiative on entrepreneurial attitudes, intentions, and activity. TEA captures entrepreneurial activity slightly differently than self-employment, that is, TEA consists of individuals undertaking steps to start a business or owning-managing a firm that has been in existence for less than 42 months. Subjective wellbeing is measured with the Satisfaction With Life Scale (Diener, 1984).

Using cross-sectional Eurobarometer data for 28 European countries Hessels et al. (2018) find that the self-employed are significantly more satisfied with their lives than wageworkers. These authors also address a specific source of heterogeneity within the group of self-employed workers, in terms of collar type (blue-collar and white-collar work) and skill level (low-skilled and high-skilled jobs). It is found that the higher life satisfaction levels among the self-employed compared to the wageworkers also hold when individuals are compared with similar occupations in terms of collar type and skill level. Furthermore, the results from Van der Zwan et al. (2018) indicate that switching from wagework to self-employment benefits work satisfaction but not life satisfaction. Given the longitudinal structure of their German data base, these authors are also able to investigate the lasting impact of the satisfaction changes. It turns out that the

increase in work satisfaction is relatively large and persistent and goes hand in hand with a large and persistent decrease in leisure satisfaction.

3. Heterogeneity Among the Self-Employed

Researchers have attempted to understand why there is a work satisfaction premium for the self-employed but that, at the same time, the investigation of life satisfaction have led to more diverse and less consistent evidence. The integration of several domain satisfactions (the "life domain view"; see also above and Binder and Coad, 2016) in this stream of research is important because it may explain why we find this discrepancy between work and life satisfaction. Binder and Coad (2016, p. 1412) call this the "crowding out phenomenon", which refers to the fact that "the work domain and its associated pleasures crowd out pleasurable experiences in other life domains." Binder and Coad (2016) investigate workers' satisfaction with health, household income, spare time, standard of living, domicile, role in the household, and family. Van der Zwan et al. (2018) focus on leisure satisfaction as an important domain determining life satisfaction together with work satisfaction.

Another explanation of the inconsistent evidence regarding the relationship between self-employment and wellbeing can be found in the heterogeneous nature of the group of the self-employed (Aguilar et al., 2013). Acknowledging the heterogeneity within self-employment has been argued to be relevant in explaining why a weaker and less consistent relationship has been found for life satisfaction than for work satisfaction (Binder and Coad, 2016). Binder (2018) and Stephan (2018) also call for the inclusion of different types of self-employment in data collection initiatives. The heterogeneity in the self-employment group has most often been based on the start-up motivation of an individual and refers to the distinction between opportunity-based and necessity-based entrepreneurship. Opportunity entrepreneurship includes individuals who act upon a perceived lucrative start-up opportunity while necessity entrepreneurship exists with the absence of better options for work (Van der Zwan et al., 2016). The distinction between opportunity and necessity entrepreneurship has also been made in the wellbeing literature (Aguilar et al., 2013; Binder and Coad, 2013; Larsson and Thulin, 2018). The life satisfaction premium seems to hold especially for opportunity-based entrepreneurs whereas for necessity-based entrepreneurs there does not seem to be a satisfaction premium (Binder and Coad, 2013; Larsson and Thulin, 2018).

That is, Binder and Coad (2013) suggest that a switch from regular employment into self-employment – indicating opportunity-based entrepreneurship – positively affects life satisfaction at least in the short-run, while a respective switch from unemployment to self-employment – indicating necessity-based entrepreneurship – does not influence life satisfaction positively.

Another distinction, based on the number of employees, has only occasionally been made in previous literature. This also means that the results

for the total group of self-employed individuals are dependent on the relative distribution of solo self-employed individuals (without employees) and employer entrepreneurs (with employees) within this group.

This distinction between the solo self-employed and the employer entrepreneurs (self-employed with employees) turns out to be an important one for at least one dimension of well-being, that is, work-related stress. Hessels, Rietveld, & Van der Zwan (2017) find that the self-employed experience significantly less work-related stress than the wageworkers, and that this difference is explained by the higher levels of job control among the self-employed. The finding that the self-employed experience less stress than wageworkers is mainly the result of the solo self-employed experiencing less stress than wageworkers. Furthermore, it is found that the solo self-employed experience significantly less work-related stress than the self-employed with employees. This difference between the two self-employment groups is partly explained by the lower levels of job demand that the solo self-employed experience.

Other differences in work characteristics between the solo self-employed and employer entrepreneurs stand out in previous literature. For example, Prottas and Thompson (2006) conclude that employer entrepreneurs work more hours, experience more job pressure, and perceive more job autonomy than solo self-employed workers. The higher levels of job demand among the employers compared to the solo self-employed have been found in other studies as well (e.g., Hessels et al., 2017), just like that the group of employer entrepreneurs works under a great deal of pressure (Blanchflower, 2004). When comparing the solo self-employed with the wageworkers, Prottas and Thompson (2006) find that the solo self-employed work less hours, experience less job pressure, but more job autonomy, than wageworkers.

4. The Self-Employed Without Employees

Table 1 provides an overview of earlier work that investigates the wellbeing of solo self-employed individuals. We list published articles only. The majority of the studies listed in Table 1 include a multivariate regression framework in which the authors control for relevant characteristics, for example at the level of the entrepreneur and/or firm. We decided to zoom in on two main comparisons made in the previous literature: the wellbeing difference between the solo self-employed and wageworkers, and the wellbeing difference between the solo self-employed and employer entrepreneurs. This means that some research has been excluded that contrasts the solo self-employed with some other part of the population (for example Simona-Moussa and Ravazzini, 2019), which would make it difficult to arrive at a uniform conclusion regarding the wellbeing levels of the solo self-employed. Carree and Verheul (2012) is included in Table 1 and does not compare the solo self-employed with employer entrepreneurs, but rather includes the number of employees in their multivariate analysis.

In terms of wellbeing measures, the studies listed in Table 1 generally focus on the following wellbeing components: a) life satisfaction and happiness, b) job/work satisfaction, c) income satisfaction, d) leisure (time) satisfaction, e) health satisfaction and (subjective) health status; and f) mental health and stress measures.

Note that the majority of studies are single-country investigations; seven of the seventeen studies in Table 1 use a multi-country framework (mainly by using data from the European Social Survey). In general, although four studies apply a multi-level framework (Benavides et al., 2000; Gevaert et al., 2018; Johansson Sevä et al., 2016; Kara and Petrescu, 2018), this also means that there is not that much known about how the relationship between solo self-employment and wellbeing differs across countries and how we can explain possible cross-country differences.

Another dimension refers to the longitudinal context. There are only three studies in Table 1 that apply a longitudinal (panel data) analysis technique (Hessels et al., 2017; Reuschke, 2019; Taylor, 2004). Hence, it could be the case that cross-sectional results as found in the majority of studies cannot be replicated when explicitly taking the time dimension into account. An example of such an analysis is the fixed-effects regression technique that focuses on the variation over time within individuals.

A recent study on how different forms of self-employment score in terms of wellbeing, Binder (2018), is not included in Table 1, because the analysis is based on a comparison of means and is not accompanied by standard errors or confidence intervals. Nevertheless, Binder (2018) – using the UK Household Longitudinal Study – reveals that the solo self-employed have higher job satisfaction levels than the paid employed. Furthermore, it turns out that the solo self-employed have higher life satisfaction levels than the paid employed, and that the solo self-employed score higher for various other satisfaction domains including health, social life, leisure time and leisure use. Only for household income the solo self-employed score lower than the paid employed.

Table 1: Overview of articles empirically testing the relationship between solo self-employment and wellbeing.

Study	Sample	Measures	Methods	Difference between solo self-employed and wageworkers	Difference between solo self-employed and employer entrepreneurs
Benavides et al. (2000)	1,836 solo self-employed, 923 employer entrepreneurs (9 employees at most) and 12,387 wageworkers in 15 European countries (Survey of Working Conditions,	1-item measures for job satisfaction, health, stress. Also three 1-item health indicators for fatigue, backache, and muscular pain	Multi-level binary logit regressions	Full-time solo self-employed less satisfied with job than full-time wageworkers; solo self-employed healthier than wageworkers; solo self-employed more stress and more	Not tested

	1996)			fatigue, backache and muscular pains	
Blanchflower (2004)	Solo self-employed, employers and wageworkers in 17 European countries (Eurobarometer, 1996)	1-item measures for job satisfaction, stress, income	Ordered logit regressions	Solo self-employed more satisfied with job; less satisfied with income; no difference for stress	Not tested
Beutell et al. (2014)	478 solo self-employed and 249 employers in the US (National Study of the Changing Workforce; 2008)	1-item measures for health and life satisfaction, 4-item scale for mental health, 3-item scale for job satisfaction	MANCOVA	Wageworkers not included in the sample	Solo self-employed better (mental) health than employers; no differences for job and life satisfaction
Carree and Verheul (2012)	1,107 Dutch founders (1994)	1-item measures for income satisfaction, leisure time satisfaction and psychological burden	OLS regressions	Wageworkers not included in the sample	No differences in income, leisure time satisfaction and psychological burden depending on the number of employees
Falco et al. (2015)	1,520 solo self-employed, 425 employers and 1,297 wageworkers in Ghana (Ghana Urban Household Panel Survey; 2004-2010)	1-item measures for life, job, financial satisfaction	Ordered probit models	Solo self-employed financially more satisfied than wageworkers; no job and life satisfaction difference	Not tested
Gevaert et al. (2018)	2,001 solo self-employed (combined group of independent own-account workers and freelancers) and 1,340 employers in 28 European countries (European Working Conditions Survey; 2015)	5-item mental health measure	Multi-level linear regressions	Wageworkers not included in the sample	No difference in mental health between solo self-employed and employers (at least 9 employees)
Hessels et al. (2017)	4,331 person-year observations in solo self-employment, 1,445 in employership and 62,488 in wagework in Australia (Household, Income and Labour Dynamics in	2-item measure for work stress	Linear fixed-effects	Solo self-employed less stress than wageworkers	Solo self-employed less stress than employers

	Australia; 2005-2013)				
Johansson Sevä et al. (2016)	148,243 workers in 21 countries (European Social Survey; 2002, 2004, 2006, 2008, 2010)	1-item life satisfaction measure	Multi-level linear regressions	Solo self-employed more satisfied with life than wageworkers	Solo self-employed less satisfied with life than employers[#]
Kara and Petrescu (2018)	4,856 self-employed in 27 countries (European Social Survey; 2012)	1-item happiness measure	Multi-level linear regressions	Wageworkers not included in the sample	No difference for happiness
Kibler et al. (2019)	186 self-employed and 544 wageworkers in the UK (2016)	1-item life satisfaction measure; 10-item stress scale	Path analysis	Not tested	No difference for life satisfaction^, stress
Petrescu (2016)	1,727 solo self-employed and 1,231 employers in 21 countries (European Social Survey; 2016)	3-item happiness scale; 1-item household income satisfaction	MANOVA and binary logit regressions	Wageworkers not included in the sample	Solo self-employed less happy and less satisfied with household income than employers
Prottas and Thompson (2006)	428 solo self-employed, 206 employers and 2,632 wageworkers in the US (National Study of the Changing Workforce; 2002)	3-item scales for job and life satisfaction; 10-item stress scale	MANCOVA	Solo self-employed less satisfied with job than wageworkers; no life satisfaction and stress differences	No job, life satisfaction and stress differences
Reuschke (2019)	33,719 workers (140,128 person-year observations) in the UK (Household Longitudinal Study; 7 waves: 2009/10-2015/16)	1-item measures for life, job, household income, leisure time and health satisfaction	Linear fixed-effects	Solo self-employed more satisfied with job, leisure and health than wageworkers; no difference for life and income satisfaction	Not tested
Sutherland (2013)	718 self-employed and 5,469 wageworkers in the UK (2006 Skills Survey)	1-item job and income satisfaction measures	Ordered logit regressions	Not tested	No difference for job and income satisfaction
Taylor (2004)	59,704 person-year observations in self-employment and wagework in the UK (British Household Panel Survey 1991-2001)	1-item job and income satisfaction measures	Random-effects ordered probit regressions	Among men and women solo self-employed more satisfied with job and income than wageworkers	Not tested
Toivanen et al. (2015)	211,465 solo proprietors and	Mortality	Cox regressions	Mortality in sole proprietorships	Not tested

	109,809 entrepreneurs in limited partnerships in Sweden (Swedish Work and Mortality Database; 2003-2008)			higher than in limited partnerships	
Warr (2018)	1,327 solo self-employed, 105 employers and 1,977 wageworkers in various countries (European Social Survey; 2006, 2012)	Two 1-item happiness measures; 1-item life satisfaction measure	Comparison of means (controlling for relevant demographic characteristics)	Solo self-employed more satisfied with job and work-nonwork balance than (nonsupervising) wageworkers; no differences for work stress, household income, happiness (apart from 1 item in 1 year)	Not tested

[#] The exact values of the test statistic and the *p*-value are not mentioned, but we base this conclusion on the text at page 247 of Johansson Sevä et al. (2016): "By changing the reference category in the models, we also find that the difference between the two groups of self-employed is statistically significant."

[^] In one model specification Kibler et al. (2019) find some evidence that the self-employed with more than 5 employees have significantly higher levels of life satisfaction than the solo self-employed.

4.1. Life Satisfaction

The two columns on the right in Table 1 summarize the empirical evidence regarding the wellbeing levels of the solo self-employed. While scanning this evidence, we note that solo self-employed workers are not worse off in terms of their life satisfaction levels than the wageworkers. Johansson Sevä et al. (2016) find that both the solo self-employed and the employer entrepreneurs have higher life satisfaction levels than wageworkers.

The results for the comparison between the solo self-employed and employer entrepreneurs are somewhat mixed. Generally, the solo self-employed do not seem to have higher life satisfaction levels than the employer entrepreneurs. Indeed, Petrescu (2016) – in line with Johansson Sevä et al. (2016) – finds that levels of happiness are higher among employer entrepreneurs than among solo self-employed workers. Prottas and Thompson (2006) do not find significant differences between wageworkers, the self-employed with employees, and the self-employed without employees in terms of life satisfaction. Although there are various other studies that report effect sizes for both the solo self-employed and employer entrepreneurs (vis-à-vis wageworkers, e.g., Reuschke, 2019) usually no tests are reported for the difference between the two groups of self-employed workers.

4.2. Work

For job satisfaction the conclusion that can be drawn from Table 1 is that it seems that solo self-employed workers are more satisfied with their jobs than wageworkers. For example, Blanchflower (2004) finds that both the solo self-employed and the employer entrepreneurs are more satisfied with their jobs than the wageworkers, but the difference is less pronounced for the employer entrepreneurs. Also, Prottas and Thompson (2006) find significant positive coefficients for solo self-employment and employer entrepreneurship relative to the group of wageworkers. In his estimates of work satisfaction using UK European Community Household Panel data, Taylor (2004) finds that among men, self-employed workers, both own-account workers and employers, are more satisfied with their work than wageworkers. We found three studies that formally test job satisfaction differences within the group of self-employed workers, and the result is that they do not find a significant difference in job satisfaction between the solo self-employed and employers.

Note that we do not dig into detail about how individuals rate various subdimensions of his/her work, such as the work content itself, job security, or the hours of work. Income satisfaction is an exception (and is included in Table 1) due to its relatively frequent investigation. The evidence is mixed. Taylor (2004) finds higher satisfaction with pay for solo self-employment than for wagework. As another example, Blanchflower (2004) reveals that the employer entrepreneurs are more satisfied with their pay than the wageworkers, while the solo self-employed are less satisfied with their pay than the wageworkers. A possible explanation behind the mixed findings in terms of income satisfaction lies in the exact model specification, and specifically regarding the question of whether income measures are included as control variables (such a measure is included in the model specification in our empirical illustration in the next section).

4.3. (Mental) Health

Mixed results have been found regarding (mental) health comparisons between wageworkers, solo self-employed workers and employer entrepreneurs, possibly partly due to the variety of measures used. Mortality was found to be significantly higher for sole proprietorships than for limited partnerships (Toivanen, Mellner, and Vinberg, 2015). Benavides et al. (2000) find that the solo self-employed report better health (in terms of less absenteeism from work) than wageworkers, although the solo self-employed also tend to report more fatigue, backache, and muscular pains, indicating that they are worse off in terms of physical health than wageworkers.

4.4. Summary

Table 2 summarizes the evidence of Table 1 in a concise way. Similar to Table 1, Table 2 draws a comparison between solo self-employed workers and wageworkers (columns under I), and between the solo self-employed and employer entrepreneurs (columns under II). A + sign means that the solo self-employed score better in terms of a wellbeing dimension than wageworkers (I) or employers (II), for example in terms of higher satisfaction levels, better health, or less stress. A – sign means that the solo self-employed are worse off than wageworkers (I) or employers (II). Finally, a 0 indicates that no significant differences have been found between solo self-employed workers on the one hand and wageworkers (I) or employers (II) on the other hand.

Table 2: Summary of evidence on the relationship between solo self-employment and wellbeing.

	Solo self-employed versus wageworkers (I)			Solo self-employed versus employers (II)		
	–	0	+	–	0	+
Life satisfaction / happiness		4	1	2	4	
Job satisfaction	2	1	4		3	
Income satisfaction	1	2	2	1	2	
Leisure (time) satisfaction			1		1	
Health (satisfaction)	1		2			1
Stress / mental health	1	3	1	0	4	2

Note: The table reports the number of studies from Table 1 that report a higher (+) or lower (–) score for solo self-employed workers compared to wageworkers (panel I) or compared to employer entrepreneurs (panel II).

5. Empirical Illustration

In this section we provide some empirical evidence on the wellbeing levels of solo self-employed individuals. For this purpose, we use longitudinal data covering a period of 15 years, available from the Household, Income and Labour Dynamics (HILDA) panel dataset in Australia (Summerfield et al., 2016). The sample is representative of the Australian adult population. This data collection effort has been in existence since 2001. Individuals have been followed over time since then. This means that for some individuals we have longitudinal information for 15 consecutive years, whereas for the majority of individuals we have a somewhat shorter time period to our availability (the average number of years an individual is followed in our empirical illustration is 5.7 years).

Our starting point is the question that asks individuals about whether they work for an employer for wages or salary, or whether they work in their own business (with or without employees). Hence, we distinguish between self-employed individuals and wageworkers, where the group of self-employed workers can be split into solo self-employed individuals and employer entrepreneurs.

Table 3: Number of observations in the HILDA dataset.

Year	Wage workers	Solo self-employed	Employer entrepren.	Total	Self-employed as % of total	Solo self-employed as % of self-employed
2001	6,189	557	235	6,981	0.11	0.70
2002	5,881	494	191	6,566	0.10	0.72
2003	5,881	460	184	6,525	0.10	0.71
2004	5,777	466	176	6,419	0.10	0.73
2005	5,931	551	486	6,968	0.15	0.53
2006	5,939	541	467	6,947	0.15	0.54
2007	5,966	512	440	6,918	0.14	0.54
2008	6,015	503	408	6,926	0.13	0.55
2009	5,922	539	402	6,863	0.14	0.57
2010	6,327	568	407	7,302	0.13	0.58
2011	8,076	767	515	9,358	0.14	0.60
2012	8,079	707	522	9,308	0.13	0.58
2013	7,934	704	490	9,128	0.13	0.59
2014	8,069	712	470	9,251	0.13	0.60
2015	7,929	714	480	9,123	0.13	0.60
Total	99,915	8,795	5,873	114,583	0.13	0.60

Table 3 provides an overview of the number of solo self-employed workers, employers, and wageworkers in each year. The agricultural sector is not taken into account. In total, about 60% of the self-employed individuals do not employ others. This percentage is very similar to the share of solo self-employment within total self-employment as revealed by Eurostat (Van Stel et al., 2014), which cover countries at similar levels of economic development. Note that during the first four years of data collection the number of sampled employer entrepreneurs is substantially lower than from the fifth wave onwards (2005). Indeed, from 2005 onwards the share of solo self-employment in total self-employment has consistently been between 53% and 60%. During these years the solo self-employment rate has steadily increased.

We compare the three groups of workers (wageworkers, solo self-employed workers, employers) along several wellbeing dimensions. These dimensions have already been discussed above. In essence, we focus in this empirical illustration on a) life satisfaction, b) job satisfaction, c) income satisfaction, d) leisure time satisfaction, e) health satisfaction and subjective health status; and f) mental health. The exact measures are listed in Table 4.

Table 4: Wellbeing measures used in the empirical part of this paper.

Wellbeing measure	Questionnaire item
Life satisfaction	All things considered, how satisfied are you with your life? Pick a number between 0 and 10 to indicate how satisfied you are. The more satisfied you are, the higher the number you should pick.
Job satisfaction	All things considered, how satisfied are you with your job? Please pick a number between 0 and 10.
Income satisfaction	I want you to pick a number between 0 and 10 to indicate how satisfied or dissatisfied you are with the following aspects of your job: - Your total pay.
Leisure satisfaction	I am now going to ask you some questions about how satisfied or dissatisfied you are with some of the things happening in your life: - The amount of free time you have.
Health	I am now going to ask you some questions about how satisfied or dissatisfied you are with some of the things happening in your life: - Your health.
Self-assessed health	In general, would you say your health is Excellent (value 5), Very good (value 4), Good (value 3), Fair (value 2), or Poor (value 1)?
Mental health	These questions are about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling. How much of the time during the past 4 weeks (1=all of the time to 6=none of the time): - Have you felt so down in the dumps that nothing could cheer you up? - Have you felt down? - Have you been a nervous person? - Have you felt calm and peaceful? - Have you been a happy person? The scores are summed up, and transformed into a 0-100 scale (fourth and fifth item have been reverse coded). A higher score means better mental health. (Five-item Mental Health Inventory (MHI), subscale of the SF-36 Health Survey)

Table 5 displays the average scores for the measures a)-f) among the three groups of workers, together with the results of an ANOVA *F*-test. The results of such an *F*-test reveal whether the average values across the three groups of workers are significantly different from each other. In Table 5 we also indicate whether there is a significant difference between solo self-employed workers and wageworkers (indicated with a superscript 1), and between solo self-employed workers and employer entrepreneurs (indicated with a superscript 2).

A few observations stand out. The differences across the three groups in terms of life satisfaction are rather small; yet, solo self-employed workers have significantly lower life satisfaction levels than employer entrepreneurs ($p<0.001$). In terms of work satisfaction, one can conclude from Table 5 that solo self-employed workers are significantly more satisfied with their work than wageworkers ($p<0.001$), but significantly less satisfied with their work than employer entrepreneurs ($p<0.001$).

Table 5: Wellbeing differences between wageworkers, solo self-employed workers and employer entrepreneurs (ANOVA).

	Life satisfaction (1-10)	Work satisfaction (1-10)	Income satisfaction (1-10)	Leisure time satisfaction (1-10)	Health satisfaction (1-10)	Health status (1-5)	Mental health (0-100)
Wage workers	7.91	7.63	7.05	6.20	7.57	3.59	75.24
Solo self-employed	7.89[2]	7.79[1,2]	6.53[1,2]	6.55[1,2]	7.42[1,2]	3.50[1,2]	76.18[1,2]
Employer entrepreneurs	7.97	7.86	6.92	5.92	7.55	3.59	77.04
F-test	8.30***	82.49***	265.66***	146.13***	34.34***	43.17***	48.14***

* $p<0.05$; ** $p<0.01$; *** $p<0.001$. [1] means significant difference ($p<0.05$) between solo self-employment and wagework; [2] means significant difference ($p<0.05$) between solo self-employment and employers.

In terms of income satisfaction we note the following. Solo self-employed workers are significantly less satisfied with their income than wageworkers ($p<0.001$) and employer entrepreneurs ($p<0.001$). Furthermore, the solo self-employed are the ones who are the most satisfied with their leisure time; the average is significantly higher than for wageworkers ($p<0.001$) and employer entrepreneur ($p<0.001$). For health satisfaction and self-assessed health the solo self-employed score significantly lower than both the wageworkers ($p<0.001$) and employer entrepreneurs ($p<0.001$). Mental health among the solo self-employed is better than among wageworkers ($p<0.001$) but worse than employer entrepreneurs ($p<0.001$).

In addition to these simple comparisons of averages, we make use of the longitudinal nature of the dataset in a second exercise. Moreover, we employ information from the dataset about the wageworkers and self-employed individuals, such as an individual's demographic characteristics. This is important because the findings above could be the result of observed differences between the employment groups. By applying linear fixed-effects regressions we are able to control for these observed differences across individuals. In addition, the advantage of a fixed-effects estimation is that we explicitly control for unobserved, time-constant effects. Hence, the obtained satisfaction differences could not be attributed to these (possibly time-varying) observed and (time-invariant) non-observed differences.

Table 6 shows the estimated coefficients for the employment groups resulting from fixed-effects regressions. The fixed-effects estimates exploit the variation over time, within individuals, and are therefore appropriate in the present longitudinal framework. Note that solo self-employment is taken as the reference category, such that the coefficients belonging to wagework and to employer entrepreneurs should be interpreted relative to solo self-employment. We include some control variables that have been frequently included in earlier studies on subjective wellbeing. That is, the control variables are educational attainment (highest education level achieved), marital status (distinguishing between married, not married, and separated/divorced/widowed), the number of children living in the household, total gross yearly personal income (in logarithms), the number of working hours per week (again logarithmically transformed), and

complete sets of sector and year (wave) dummies. We display the coefficients of the employment groups only; the estimated coefficients for the other (control) variables included are available from the authors upon request.

Table 6: Linear fixed-effects regression analyses with the wellbeing measures as the dependent variables.

	Life satisfaction (1-10)	Work satisfaction (1-10)	Income satisfaction (1-10)	Leisure time satisfaction (1-10)	Health satisfaction (1-10)	Health status (1-5)	Mental health (0-100)
Wage workers	0.016	-0.150***	0.492***	-0.216***	-0.017	-0.017	-0.202
	(0.021)	(0.035)	(0.047)	(0.043)	(0.025)	(0.012)	(0.236)
Solo self-employed	ref.	ref.	ref.	ref.	ref.	ref.	ref.
Employer entr.	-0.007	-0.006	0.179**	-0.364***	-0.010	-0.022	-0.937**
	(0.026)	(0.039)	(0.054)	(0.054)	(0.033)	(0.016)	(0.315)

* $p<0.05$; ** $p<0.01$; *** $p<0.001$. Cluster-robust standard errors between parentheses. ref.=reference category. Total number of observations is 114,583 (for 20,200 individuals). HILDA data (2001-2015) are used. The following control variables are included: educational attainment (highest education level achieved), marital status (distinguishing between married, not married, and separated/divorced/widowed), the number of children living in the household, total gross yearly personal income (in logarithms), the number of working hours per week (again logarithmically transformed), and complete sets of sector and year (wave) dummies.

In terms of life satisfaction there are no significant differences between solo self-employment, wagework (p=0.14), and employership (p=0.71). Regarding work satisfaction we observe that solo self-employment is associated with an increase of 0.150 compared to wagework (p<0.001). There is no significant work satisfaction difference between solo self-employment and employer entrepreneurship (p=0.92).

For income satisfaction we note that (while we also control for gross yearly income) solo self-employment is associated with less income satisfaction than wagework (β=0.492; p<0.001) and employer entrepreneurship (β=0.179; p<0.01). At the same time there is a leisure satisfaction premium for solo self-employment compared to wagework (β=0.216; p<0.001) and employer entrepreneurship (β=0.364; p<0.001). The other interesting observation here is that the employer entrepreneurship status also performs worse than the wageworker status in terms of leisure satisfaction, which could also explain the earlier found persistent decline in leisure satisfaction after individuals switch from wagework to (employer) self-employment (Van der Zwan, Hessels, & Rietveld, 2018).

In terms of health satisfaction and self-assessed health status we do not find significant differences between solo self-employment on the one hand and wagework and employer entrepreneurship on the other hand. Finally, we find that solo self-employment is associated with a somewhat better mental health situation than the status of employer entrepreneurship (β=-0.937; p=0.003). This is remarkable since a simple comparison between solo self-employed workers and employer entrepreneurs pointed in the opposite direction (see Table 5).

Hence, notwithstanding that employer entrepreneurs on average have a slightly better mental health than solo self-employed workers (Table 5), the results in Table 6 suggest that individuals switching between the statuses of employer entrepreneurship and solo self-employment during the sample period (in whatever direction) experienced worse mental health while being an employer entrepreneur. The impact is small though (almost one point on a 100-point scale).

6. Conclusion

This paper focused on the wellbeing levels of solo self-employed individuals. In this way, we addressed an important source of heterogeneity within the group of self-employed workers, viz. whether or not the self-employed have employees. Although various earlier studies addressed this heterogeneity, there have not been many studies on the relationship between solo self-employment and wellbeing. First, we provided an overview of current studies on the topic and summarized the evidence. We found mixed evidence for various dimensions of wellbeing, thereby contrasting the solo self-employed with both the wageworkers and the employer entrepreneurs (the self-employed with employees). Second, we performed an empirical exercise using Australian longitudinal data, where we first compared various dimensions of wellbeing between solo self-employed workers, employer entrepreneurs and wageworkers by means of an ANOVA analysis, and then focused on individuals switching between these employment statuses by means of a linear fixed-effects regression analysis. We found consistent patterns between these two methods for only two out of our seven wellbeing dimensions, showing the important difference between cross-sectional methods (where wellbeing levels are compared between individuals) and longitudinal methods (where wellbeing levels are compared for a given individual who switches between labor market states within the sample period). Our consistent finding, both using the ANOVA and the linear fixed-effects regression analyses, is that solo self-employment is associated with a significantly higher leisure time satisfaction and a significantly lower income satisfaction, compared to both wagework and employer entrepreneurship.

There are several avenues for future research. As this study has shown, most research to date in this area has applied cross-sectional methods while results may be quite different when longitudinal methods are used, focusing on over-time variations within individuals rather than cross-sectional variations. Hence, the first avenue for future research is to validate our results in other countries in a longitudinal setting, and more importantly, to investigate cross-country differences. Although there were a few earlier studies performing multi-level regressions, none were focused on disentangling country differences and explaining where possible country differences may come from. Second, we acknowledge the fact that solo self-employment is the dominant form of self-employment, but future research may also focus on the way in which the number

of employees is related to wellbeing levels among employer entrepreneurs. This enables to see for which subgroups of employer entrepreneurs our results (as found in our empirical illustration) exactly hold. Third, future research may want to focus on explaining the differences in wellbeing between the employment groups as found in our study, possibly based on job characteristics. Fourth, we suggest to also consider heterogeneity within solo self-employment in future studies such as based on their startup motivation (push versus pull), their age at becoming self-employed, or simply different age groups.

In sum, the current contribution is a first attempt to provide an overview of present research on the relationship between solo self-employment and wellbeing. Future research can build on this paper to realize a more generalized picture and overarching framework on how good or bad the lives are of the solo self-employed.

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