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How can wages sustain a living? By getting ahead of the curve

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Abstract

Work may be a panacea for poverty but the world of work in 2018 is characterised by 'Working Poverty,' including poor wages. Living wages are a contested idea for resolving the paradox, with empirical evidence on how they might do so being scarce. Theoretically, a living wage enables people to escape from poverty traps, indicated by qualitative improvements in quality of work and life beyond a set income. Alternatively, diminishing marginal returns suggest that any wage is a good wage, particularly at low pay levels. We explored these possibilities with almost 900 low-income workers across two diverse countries, New Zealand and South Africa, on reliable indicators of workplace justice, job quality, and life satisfaction. A coherent pattern occurred: trap-rise-pause-rise. At wages below $\pm \$2000$ per month, workers felt trapped in injustice, disengagement and dissatisfaction; above, they reported the opposite. This rise was starker in South Africa, where income inequality was highest. After a pause in satisfaction level (rising aspiration/relative deprivation), levels rose, with diminishing marginal returns. This pattern of trap-rise-pause-rise links two 'competing' theories of sustainable livelihood. Each matters but at different points on one wage spectrum. Wages may become 'living' only once they get ahead of a cusp in a wages-wellbeing curve, at a point or range determined empirically. Replicating this pattern across two very different countries suggests robustness, and may be a promising step towards a science of sustainable livelihood. However, we still require more systematic sampling, across more countries and groups, before the findings may be generalized.

Keywords Income inequality · New Zealand · Living wages · Poverty reduction · South Africa · Sustainable Development Goals (SDGs) 1, 8, 10 · Working Poverty

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Introduction

Jobs are central to sustainability. In the words of a World Development Report, “As jobs provide earnings, generate output, and influence identity they shape the well-being of those who hold them - and they also affect the well-being of others” (2012, p. 15). Jobs can also be unsustainable however, for instance if a legal minimum wage falls below the basic cost-of-living, or when work conditions are insecure and “precarious” (Standing 2011, 2014), leaving workers “vulnerable” (ILO [International Labour Organization] 2013). The broad backdrop for this research is a global canvas of “working poverty,” in which despite macro-economic growth and rising employment rates, more than half of the world’s working population is struggling to pay the bills (ILO 2018). One obvious way for everyday life to become more sustainable is for employees and indirectly their households to receive an adequate amount of money (UNDP 2014). Unconditional Basic Income (or UBI) is one potential, prospective solution to precarious livelihoods (Davalos et al. 2015). Another possibility, more proximal and potentially perhaps sustainable, is by reversing current declines in pay outcomes for jobs at the lower ends of the wage spectrum (ILO 2018).

Any kind of threshold in salary value from which sustainable livelihoods become possible has been referred to as the living wage. The definition of a living wage in theory not only meets the monetary costs-of-living, but also improves people’s wellbeing, and possibly even spills over into benefits for society-at-large (ILO 2016; Oxfam 2014). It thus is part of what the ILO (2016) terms “decent work”: work which provides a fair income as well as dignity, equality and a safe working environment. Yet, according to Project GLOW (Global Living Organizational Wage), and the Society for Industrial and Organizational Psychology (SIOP), the benefits of living wages to employers remain largely uncharted, leaving the majority of employers unconvinced about the economic utility of increasing wages to living wage standards (GLOW/SIOP 2016).

Our aim in this research is to take a relatively direct, personal and humanistic approach to the link between jobs and sustainable livelihoods. We incorporate some additional key insights from social and organizational psychology into a traditionally economist driven debate. We do so through the prism of wages and their broader spill-over effects on quality of work life for the employee and others, including households, employers and society. Therefore, this paper responds to a call from the World Bank (2012) to scientifically, reliably “assess these...broader payoffs” that jobs in general, and living wages in particular, may or may not bring (ibid, p. 15).

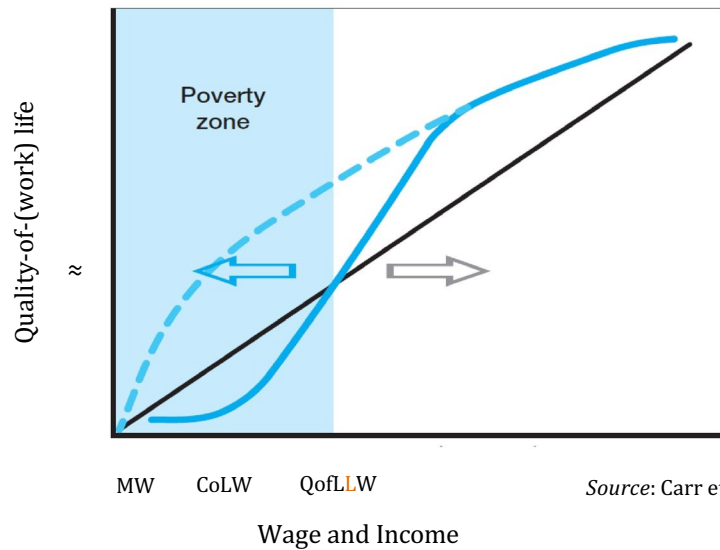
The wage spectrum

According to Gould (1994, p. 38) “Science without taxonomy is blind”. Wages are no exception, with most studies of wages and working poverty focusing on single or binary wage points, e.g., before vs. after a campaigned minimum or living wage figure. We need a wage spectrum if research is to probe the links between wage levels and human wellbeing.

At one end of this spectrum, any national minimum wage provides a legal floor to provide protection for workers and encourage fair competition among employers (Deeks et al. 1994). However, minimum wages are now widely recognized as failing to provide sufficient cost-of-living income (Cunniah 2012). In part, this may be due to the growth of informal work, poor awareness and weak enforcement of wage laws (Oxfam 2014; Smith 2015). Each of these by definition would simply by-pass legal safety nets like the minimum wage. However, the gap is also attributable, in the formal sector, to minimum wage rates not matching increasing costs of living and realities of precarious work (Favager et al. 2017; ILO 2016). At the other end of the spectrum the idea of a living wage has captured some public imagination, as is reflected in Living Wage campaigns across the world. Such campaigns set wage values that are (1) higher than minimum wage rates (Oxfam 2014), and (2) derived from calculations of the material cost-of-living needs of a hypothetical household unit (Anker and Anker 2017). However, this commodification of the living wage ignores that the broader concept of a living wage goes much further. The ILO definition of decent work (ILO 2013) implies that not just cost-of-living but also (3) human quality-of-living will follow from meeting everyday material needs (Stuart et al. 2017; Townsend 1979). Included in this concept of a wage that allows for quality of life, for instance, are people’s aspirations for reciprocity and fairness (Alkire 2007; DiFabio and Maree 2016). In theory then, living wages conceivably may link rising wage levels to rising equity and justice in the workplace, and in wider society (Glickman 1997; Morelli and Seaman 2015).

Somewhat surprisingly, compared to middle and upper-waged counterparts (Judge et al. 2010), psychology knows very little about the nature of links between pay/income, and everyday quality of life and work life, at the lower tail of wage and income distributions (Bergman and Jean 2015). Ironically, nowhere in the psychology research literature are people’s direct everyday experiences, qualities of social life, and work life, calibrated alongside continuous variations in money (Gloss et al. 2017). Instead, Living Wage campaigners and employers alike tend to argue about the merits and demerits of a particular monetary

Fig. 1 Three possible relationships between wages and quality of life



Source: Carr et al. (2016a).

Key: MW=Legal Minimum Wage; CoLW=Cost-of-LW; QoLLW=Quality-of-Life-Living-Wage

figure, in effect a single data point on a much wider wage spectrum. This might be a legal minimum wage figure (e.g. Card and Krueger 1994) or a living wage figure (e.g. Adams and Neumark 2005; Maloney and Gilberston 2013). Sometimes too, it is a discrete wage difference between two points, e.g., from one local county to the next (Dube et al. 2008) or from before to after a living wage city ordinance figure (Fairris et al. 2015). However, two wage points do not a wage spectrum make, and without a continuum of wage values, in effect a wage variable, we will never know the scientific relationship between wages on the one hand and quality of living on the other, and hence any optimal wage value, or range, for employees and employers alike.

Continuous variations and their ripple effects are important and informative (Carr 2013). They concern not only the individual employee's wellbeing, but also the sustainability of households, communities, and societies. Better quality of life may help to reduce social ills (less crime, violence, health problems, better education, environmental degradation). More satisfied workers might also be more productive, leading to better organizational performance (Carr 2013). Prior research from organizational psychology shows that wage levels are linked to sense of fairness at work (Judge and Kammeyer-Mueller 2012), job satisfaction (Judge et al. 2010), work engagement (Harter et al. 2002), and organizational commitment (Meyer et al. 2002). Further, these same variables are also predictive of workplace and business unit performance (Harter et al. 2002; Jaramillo et al. 2005), especially over time (Harrison et al. 2006; Riketta 2008), and in lower-income jobs and settings (Davar and Bala 2012;

George and Brief 1989). Job attitudes can therefore in theory mediate between wages on the one hand and shared inclusive prosperity on the other. If so, a living wage could become a win-win, for both employee and employer, across business and society (Zeng and Honig 2017).

As we recently argued to the United Nations' (UN) (GLOW/SIOP 2016), fundamentally, there is a dearth of systematic evidence about the actual human, social psychological and organizational ramifications of differing wage levels along the lower reaches of the wage spectrum where the majority of the world ironically live and work, and for whom wages may be more salient (e.g., George and Brief 1989; to; Gloss et al. 2017).

A primary aim in this paper is assessing and exploring that relationship. The international context for our research question: What is the link between wage spectrum and human flourishing, is shaped by interrelated global challenges (UN 2016) of eradicating poverty and inequality (International Monetary Fund (IMF) 2016), including "working poverty" amongst employees in all countries through decent work and economic growth (ILO 2016; World Bank 2012). Working poverty through less-than-living wages poses a major challenge for the United Nations Sustainable Development Goals (or "SDGs," United Nations 2016) to eradicate poverty (SDG1) and inequality (SDG10), including through inclusive industrialization (SDG9) and access to decent work (SDG 8).

Figure 1 below synthesises what the linkages between wage/income levels, and quality of (work) life may look like. These competing predictions are drawn from across theories of work psychology, economics, and psychophysics.

The simplest possible relationship is linear and positive, with more money equalling steady increments in quality-of-life and work-life variables such as happiness and job satisfaction (Fisher 2010). This is the relationship that is most widely assumed in organizational psychology (Judge et al. 2010). Thus, the standard (linear) method of exploring the linkage is included (and estimated) comparatively in Fig. 1 (straight line).

Alternatively, the relationship might be *S*-shaped (solid blue line in Fig. 1). This possibility (Carr et al. 2016a), draws on the concept of a poverty trap (Azariadis 1996; Barrett and Swallow 2005). Trap theory argues that people who earn very low incomes will often become trapped below or on the proverbial waterline (\approx), for instance, by having to rely on ‘loan sharks’ to meet routine economic necessities or shocks, or even the added costs of finding and starting a job (Kraay and McKenzie 2014). This process can become pernicious, with less money leading to even less money. Only above (and never below) a certain wage threshold, according to this theory, will people earn enough to ever start to thrive.

Empirical research on poverty traps typically commodifies the concept by plotting money today against future income, i.e., showing that low income today leads to downward income mobility. Sen (1999) has argued however that with respect to human development, including thriving, income functions as a *means* to an end, rather than as an end in itself. The poverty in working poverty is about downward spiralling qualities of life, and work life (Sen 1999). A corollary of this proposition is that money serves as an enabler—for people to meet their aspirations of a better quality of life, and work life, for themselves and future generations (Carr et al. 2016a). According to this model therefore, the concept of a poverty trap suggests that we need a quality-of-life-living wage (QoLLW, Fig. 1). Above the QoLLW, people, and the organizations that employ them, may thrive but below working poverty will stubbornly persist. In other words, there will be a living wage (QoLLW) threshold: quality of (work) life will not rise until and unless it is crossed (Carr et al. 2016a). With variations in dependents, household size etc., this threshold may resemble a pivotal wage range (Yao et al. 2017).

A third, directly competing theory has different wage implications (dotted line in Fig. 1): diminishing marginal returns, also known in psychology (where it originated) as just noticeable differences (JNDs), implies that any increment in wages enables thriving, especially at lower levels (Thurstone 1927). The reasoning behind this behavioural science theory is that a dollar in the pocket is all the more valuable when incomes are lower than higher, in other words that any job, no matter how poorly paid, and especially at lower pay levels, is better than none. According to this behavioural model, minimum wages (MW on the *x*-axis) will save money and enable new job creation, eventually enabling

not only fuller employment but also cost-of-living wages (CoLW, on the *x*-axis) and QoLLW (on the *x*-axis); each of which may enhance quality-of-(work) life, on the *y*-axis.

Research evidence

A recent study of the relationship between household income and a range of indicators, including job and life satisfaction, workplace empowerment, pride and wage fairness, was conducted in New Zealand (Carr et al. 2016b). The link between these indicators and household income was reportedly more cusped (solid blue) than smooth (dotted) curve in Fig. 1. Specifically, there was a sharp inflexion upwards for job and life satisfaction, workplace empowerment etc., between NZ \$30,000–NZ \$40,000 gross household income per annum. Quantitatively, as income traversed this pivotal range (Yao et al. 2017), the qualities of life measured reportedly transformed from predominantly negative (e.g., job and life dis-satisfaction, empowerment etc.) to positive (e.g., job and life satisfaction etc.). Qualitatively, a majority of people whose households were inside the NZ \$30,000 s bracket reported not having enough to make ends meet; at household incomes above NZ \$40,000 however, there was a significant shift, with a majority inside that 40ks bracket reporting they *were* making ends meet (Carr et al. 2016b; Yao et al. 2017).

This research was preliminary for several reasons (Carr et al. 2016b). First, the measures of quality of life and work-life were single-item, potentially restricting reliability, validity, and statistical power to test for non-linear relationships like those in Fig. 1 on the wage spectrum (Yao et al. 2017). The study reported on in this paper aimed to use multi-item measures. Second, although New Zealand is reportedly a “low wage” economy (OECD [Organization for Economic Cooperation and Development] 2014), the sample relied on internet access and was thus skewed towards the middle classes (Carr et al. 2016b). This current study purposely extends our sample further towards the lower ranges of the wage spectrum (Gloss et al. 2017). Third, although New Zealand has in the past few decades slipped to the fifth most unequal in the OECD (2014), in global terms it remains a relatively egalitarian economy. Inequality, however, means precisely a sharper division between ‘haves’ and ‘have nots’, and thus a sharper bifurcation in the income distribution at country and organizational levels (Carr et al. 2016a). A higher country or organizational Gini coefficient could in theory increase the salience of earning a “living” wage (George and Brief 1989), i.e., steepen the gradient above the diagonal (solid blue line, Fig. 1). Exploring this possibility was a core aim in the current study. Logically it required us to choose at least one other, different country as a comparison point, one in which income inequality was sharply higher.

Given these aims and the dearth of evidence around them, we decided to conduct an exploratory, non-linear, multi-item exploratory probe for patterns akin to those in Fig. 1, based on purposively sampled lower-income participants, from across more than one country, which varied in the severity of inequality. For these exploratory purposes, we chose two particular countries, New Zealand (baseline) and South Africa.

It is important for us to stress at this point what we did not aim to achieve, imply or infer generalisability by this sampling. We did not seek to generalize beyond the samples, but rather to primarily explore whether any of the relationships in Fig. 1 emerged in and replicated across the diverse contexts. Similarity in any given function, across diverse settings and perspectives, can indicate robustness (e.g., Gergen 1973; Other 2012; Schupbach 1998). To that extent, any recurring pattern(s) observed in the empirical data, across the two country settings, would warrant further, more systematic sample of groups, across a far wider variety of locations.

New Zealand introduced a living wage campaign in 2012 (King and Waldegrave 2012, 2014). In 2015, when the data for this study were gathered, the econometrically calculated living wage was NZ\$ 18.80 per hour. While there is no living wage figure for South Africa, the country has a strong protest culture with most strikes related to demands for salary increases, most notoriously the 2012 campaign by platinum miners for a living wage of SAR 12,500 per month, in which 34 protesting miners lost their lives in the tragic shooting by riot police (Alexander et al. 2013). Further, South Africa now has the consistently highest level of inequality (i.e. Gini co-efficient of 0.7) in the world (Bhorat 2015), thus enabling a relatively clear contrast with New Zealand on the inequality variable.

Summing up, we sought to probe and explore whether the linkages between hourly wages and household income, and wage justice and happiness (at work and in life) would more closely resemble steadily diminishing marginal returns (dotted blue line, Fig. 1); or S-shaped sigmoidal pattern (solid blue line) in Fig. 1. We also explored whether any curve observed would potentially pivot more steeply in South Africa than in New Zealand (Carr et al. 2016a).

Method

Participants

A combined total of $N = 895$ people took part in the study, cluster-sampled under conditions of informed consent and confidentiality in New Zealand ($n = 404$) and South Africa ($n = 491$). It is important to stress that this was not a probability sample but purposive (Lavrakas 2008). In purposive

sampling the locations and groups sampled are deliberately chosen to be information-rich rather than more broadly representative (Palinkas et al. 2015).

In our case, we first of all chose two countries with diverse Gini coefficients at the societal level. This not only allowed us to probe for any differences in the relationship between quality of work-life and life indicators and income in relatively unequal and equal societies, but also was consistent with a cross-cultural principle in social science (Carr 2013): Finding similar relationships between variables, across diverse settings, indicates a relationship is relatively robust (Gergen 1973).

Within each country, on a similar basis, we cluster-sampled from the two major urban centres in which working poverty is concentrated, Auckland City ($n = 203$) and Christchurch City ($n = 201$) in New Zealand, and Gauteng ($n = 205$) and Cape Town ($n = 290$) in South Africa. Within Auckland in turn we sampled approximately equally from two community cafés in relatively low-income neighbourhoods in South Auckland. These two community cafés were put into place precisely to provide a service to low-income residents, who would likely feel safer and find more rapport in them (Affirming Works 2017). In other words, the people who visit a specific community café in this part of Auckland were likely to be more rather than less representative of low-income residents in that (key) city. Using a similar rationale, in Christchurch we sampled from one shopping centre in a relatively low-income suburb of the city. In Gauteng and Cape Town, the samples were likewise drawn from shopping centres servicing lower-income neighbourhoods in each major city.

Demographically, the mean age across the New Zealand sample was 40.03 years ($SD = 14.55$). From the $n = 395$ New Zealand participants who reported their gender, there were $n = 221$ female and $n = 174$ male participants. English was the first language for $n = 298$ participants, i.e., not the first language for $n = 96$ participants (with $n = 10$ missing). Of the $n = 488$ South Africans who reported their gender, there were $n = 218$ female and $n = 270$ male participants. English was *not* the first language for $n = 348$ of the South African participants, i.e., it was the first language for $n = 135$ participants (with $n = 7$ missing). With the exception of first language, samples were thus comparable.

In both countries a majority ($n = 214$ in New Zealand, $n = 348$ in South Africa) reported being employed full-time (> 30 h per week), with respectively $n = 122$ and $n = 125$ participants who reported being in part-time employment. There was $n = 42$ and $n = 10$ who self-reported as being unemployed (missing $n = 26$, $n = 8$). A minority of participants ($n = 69$, $n = 65$) reported holding more than one job. A majority ($n = 224$, $n = 271$) were in permanent employment; however, $n = 35$, $n = 107$ held fixed contracts and $n = 54$, $n = 77$ were working in casual jobs (e.g., on call);

with $n = 36$, $n = 23$ who reported as “self-employed” (missing $n = 55$, $n = 13$). Most households had between 1 and 2 incomes (single income $n = 97$ and double income $n = 173$ in New Zealand; $n = 173$ and $n = 183$ for single and double income respectively in South Africa). Modally, in New Zealand between one ($n = 130$) and two ($n = 132$) incomes were full-time, in South Africa the mode was one full-time income ($n = 200$). Thus, the major working arrangement was one or two full-time permanent incomes per household.

Occupational categories in New Zealand included community and personal service work ($n = 67$); labourers ($n = 32$); technical and trade ($n = 29$); sales ($n = 26$); clerical and administrative work ($n = 21$); and machine operators ($n = 11$). There were also managers ($n = 26$) and professionals ($n = 56$). There was $n = 40$ in “other” types of work (Missing $n = 96$). In South Africa, occupations also included community and personal service work ($n = 57$), private household work ($n = 58$), wholesale/retail ($n = 56$), transport, storage and communication ($n = 37$), mining and manufacturing ($n = 33$), catering and accommodation ($n = 25$), electricity gas and water ($n = 23$), and agriculture fishing and forestry ($n = 7$). There were also finance, real estate and business services ($n = 35$). There was $n = 94$ in “other” types of work (missing $n = 36$).

Sectors in New Zealand included publicly funded ($n = 165$); private industry ($n = 66$); private services ($n = 92$); voluntary/not for profit work ($n = 28$); and missing ($n = 53$). Modal number of co-employees was 10–49 ($n = 95$ participants), with $n = 90$ participants reporting having fewer than 10 co-employees, $n = 53$ from 50 to 149, $n = 42$ from 150 to 499, and $n = 72$ with > 500 employees (missing $n = 52$). These workplaces were evenly split between unionised ($n = 119$ respondents) and not unionised ($n = 130$) organizations, with $n = 112$ “don’t know” and $n = 43$ missing. Sectors in South Africa included publicly funded ($n = 116$); private industry ($n = 159$); private services ($n = 170$); voluntary/not for profit work ($n = 28$); and missing ($n = 18$). Modal number of co-employees was 10–49 ($n = 155$ participants), with $n = 115$ participants reporting having fewer than 10 co-employees, $n = 131$ from 50 to 149, $n = 41$ from 150 to 499, and $n = 39$ with > 500 employees (missing $n = 10$). These workplaces were split between unionised ($n = 174$ respondents) and not unionised ($n = 215$) organizations, with $n = 92$ “don’t know” and $n = 8$ missing. Thus, there were overall sector-wise similarities across countries.

In terms of living arrangements, in New Zealand/South Africa $n = 147/n = 101$ participants rented solely or with a partner; $n = 53/n = 55$ rented with friends/flatmates; $n = 41/n = 32$ rented with family other than partner; $n = 50/n = 139$ were living in a family home; $n = 62/n = 62$ were homeowners with a mortgage; and $n = 41/n = 77$ (including $n = 10$ shacks) were homeowners mortgage-free (missing $n = 10/n = 19$). The modal number of people

living in the household was 3 in New Zealand ($n = 92$), 4 in South Africa ($n = 128$); with modally 0 children in New Zealand ($n = 166$), 0 children in South Africa ($n = 123$) and 0 dependents other than children ($n = 251$ in New Zealand, $n = 186$ in South Africa). Again, these proportions are not unevenly balanced across the two countries, and in that sense may be less likely to introduce bias (via different living arrangements).

Measures

Money In each location, and based on piloting with people from the relevant communities above, we asked participants to disclose on an anonymous basis as many of the following that were applicable and apt, in their judgement, for their working circumstances: Household total annual income (bracketed in New Zealand, open-ended in South Africa), monthly household income (South Africa only); plus, for own pay and income, hourly, daily, weekly, fortnightly (New Zealand only), monthly and annual rate of pay (New Zealand only). We also asked an open-ended question related to money, “How well does your wage work for you? Feel free to tell us any stories or comments.”

Fairness was measured with four items, each with a distinctive, non-overlapping referent. We asked, “Do you think your wage is a ‘fair rate’?” for each of the following (coded Yes = 1, Don’t know/NA [Not applicable] = 0, No = -1)

- for the job;
- compared to your effort;
- compared to your qualifications; and
- compared to similar jobs elsewhere;

Originally We had included three items measuring *upward comparison* (meaning the extent to which people compare their pay with fellow employees who are higher on the organizational pay scale). However, for these last three items, the Don’t Know/NA option jumped sharply and became the modal response category ($n = 129$, $n = 144$, $n = 158$, respectively). With hindsight, given the nature of the jobs (*Participants*), many respondents may have not had ‘CEOs’ and other forms of formal line manager. Hence, we decided to drop these items and focus on sense of pay being FAIR.

Quality of Work Life (WORK) was assessed using three items that the literature suggests are collectively distinct from fairness, and indicative of complementary and distinctive aspects of work-related happiness (Fisher 2010; Sirota et al. 2005). A focus on single-item scales (such as for job satisfaction) reflects common practice with meta-analysis research (Wanous et al. 1997; Fisher et al. 2016).

- **Job satisfaction** We asked respondents “How satisfied are you with your primary job in general?” (-1 = frowning face, 0 = neutral face, +1 = smiling face.). Accord-

ing to Fisher (2010), such icons are more effective than traditional Likert-type scales at capturing the affective components of job satisfaction;

- *Empowerment at work* means employees feel that they have some control over how they do their work, and in workplace decisions that directly affect them personally. We asked respondents, in the light of this provided definition, “At work, how ‘empowered’ do you feel in general?” and invited them to “please indicate/circle how empowered you feel. 10 is full empowerment and 0 is zero”. This coding format was suggested through the consultative process, as was;
- *Occupational pride* “How proud does your work make you feel?” (− 1 = frowning face, + 1 = smiling face, with 0 in-between).

Quality of Life (LIFE) was assessed similarly to work capability, with four items collectively indicative of non-work-related happiness:

- *Life satisfaction* “How satisfied are you with life in general?” (− 1 = frowning face, + 1 = smiling face, 0 = in-between);
- *Physical well-being* “How would you rate your physical wellbeing?” (3-points);
- *Mental stress* “How would you rate your stress levels generally” (3-points).

Procedure

Measures above were developed in close consultation with a range of stakeholder groups in each location, from the community, business, labour and social enterprises (for details, Carr et al. 2016b), as well as from each research team in each of the four participating cities (above). Collectively we aimed to respect the UN principles of alignment, ownership, accountability, harmonisation and being data driven (Paris Declaration on Aid Effectiveness 2005). This included keeping items clear, e.g., not too fine-grained, on paper, anonymous and confidential. The procedure was scrutinised by the Human Ethics committees in Universities in all four participating cities.

The data in New Zealand were collected during the first quarter of 2016. In Auckland, they were collected through the auspices of two community cafés that were run by a Social Enterprise, located in two relatively low-income suburbs in South Auckland. On a random walk basis, as customers came into the cafés, they were presented with an invitation to participate, after which they would receive a free cup of fairly traded organic coffee, and could be assisted by our Research Assistants, should they need help, who were working as volunteer baristas at the time (see authors). Completed

questionnaires were handed in anonymously. Debriefing took place after peer review, in the same community cafés, with the same stakeholder audience invited to a public seminar/roundtable. In this way, we returned the data to the people who lent it to the research team in the first place. In Christchurch, Tshwane and Cape Town, the data were collected by random walk through at least one shopping centre.

Results

Data reduction

Money Among wage and income items, four had usable response rates: In New Zealand, household annual income bracket ($n = 366$, missing $n = 38$), and hourly rate ($n = 161$, missing $n = 242$). Remaining items (daily, weekly, fortnightly, monthly, annual pay) had high rates of data missing ($n > 355$). We therefore focused on (1) household income annual and (2) hourly wage (the unit used by the Living Wage Campaign in New Zealand). In South Africa, using the same criteria, we relied on two different indexes: Household monthly income ($n = 395$); and monthly salary ($n = 420$).

In New Zealand where our questions about household income were bracketed based on consultation processes of alignment (above), household income bracket (gross) was evenly spread up to NZ\$ 40Ks per annum (<NZ\$ 10 k $n = 32$; NZ\$ 20ks $n = 35$; NZ\$ 30ks $n = 51$; NZ\$ 40ks $n = 49$; NZ\$ 50ks $n = 28$; NZ\$ 60ks $n = 40$; NZ\$ 70ks $n = 23$); and thereafter dropped in frequency noticeably (NZ\$ 80ks $n = 9$; NZ\$ 100–110 ks $n = 15$; NZ\$ 120–140 ks $n = 14$; NZ\$ 150–190 ks $n = 13$; > NZ\$ 200 k $n = 13$). Mean hourly rate was NZ\$ 22.95 (range = NZ\$ 11.45–120.00, SD = 13.93). This was somewhat above the living wage campaign’s figure of NZ\$ 19.25 per hour (in 2015), but well within 1 SD (the figure climbed to NZ\$ 19.80 on July 1st, 2016, shortly after the data collection was completed). More respondents ($n = 236$) had not heard than heard ($n = 158$) of the living wage campaign (missing $n = 10$). Most respondents ($n = 205$) reported that they did not know whether their workplace offered a living wage initiative (No $n = 111$; Yes $n = 32$, missing $n = 56$). In South Africa, mean monthly household income was SAR 98,00.77 (SD = SAR 15,204.767). Most respondents had not heard of the living wage campaign ($n = 367$) than heard about it ($n = 106$), with missing $n = 18$. Not surprisingly given these figures, most ($n = 262$) reported that their workplace did not offer a living wage initiative ($n = 43$ reported yes, $n = 165$ do not know, missing $n = 21$).

In terms of pay and income, in New Zealand, a majority of respondents ($n = 244$) reported that their pay provided enough to meet their basic needs, however $n = 109$ reported that it was not sufficient (missing $n = 51$). A minority of the overall sample of $n = 404$ ($n = 193$) reported that their

income exceeded what they considered to be basic needs, e.g., enabling some savings, some leisure activities, having the occasional treat. However, a sizeable number ($n = 151$) reported not being in this position (missing $n = 60$). In South Africa, a majority of respondents ($n = 242$) reported that their pay did *not* meet basic needs ($n = 242$) compared to did ($n = 237$, missing $n = 12$), a gap that widened with respect to exceeding basic needs ($n = 160$ yes, $n = 315$ No, missing $n = 15$). Thus, our respondents in South Africa were more clearly struggling financially compared to our respondents in New Zealand.

FAIR, WORK, life Data were collected from New Zealand and South Africa. In total, we had $n = 404$ New Zealand respondents and $n = 491$ South African respondents, for a combined data set of $N = 895$. As the New Zealand data were collected slightly ahead of the South African data set, we conducted the initial exploratory factor analysis (EFA) on the New Zealand data. To test the factor structure of the items, an exploratory factor analysis (principal components, Varimax rotation) was run. Overall, three factors emerged supporting our constructs: pay FAIR (4-items), quality of WORK life (3-items) and quality of LIFE (3-items).

Each factor had an eigenvalue > 1 (FAIR = 3.25, WORK = 1.94, and LIFE = 1.26), accounting for 64.5% of variance (FAIR = 32.5%, WORK = 19.4% and LIFE = 12.6%), and achieving adequate reliability (fairness $\alpha = 0.85$, work $\alpha = 0.69$, and life $\alpha = 0.62$).

We then confirmed the nature of the South African data by repeating the analysis. To test the South African factor structure of the items, an exploratory factor analysis (principal components, Varimax rotation) was also run. This split into the same three factors: FAIR (4-items), WORK (3-items) and LIFE (3-items). Each factor had an eigenvalue greater than 1 (fairness = 3.79, work = 1.62, and life = 1.05) and accounting for 66.7% of variance (fairness = 37.9%, work = 16.2% and life = 10.5%) and achieving adequate reliability (fairness $\alpha = 0.79$, work $\alpha = 0.74$, and life $\alpha = 0.74$).

Given the EFA confirmed identical factor structures we combined the data and further the combined data in AMOS. A CFA was conducted to confirm the distinct nature of the measures using AMOS version 22.0. Williams et al. (2009) suggest three goodness-of-fit indexes to assess model fit: (1) the comparative fit index ($CFI \geq 0.95$), (2) the root-mean-square error of approximation ($RMSEA \leq 0.08$), and (3) the standardized root mean residual ($SRMR \leq .10$). The hypothesized measurement model and three alternative models were tested. The hypothesized factor structure in the CFA in AMOS and this was a good fit for the data (Williams et al. 2009): $\chi^2(32) = 82.45$ ($p = .000$), $CFI = 0.98$, $RMSEA = 0.04$ and $SRMR = 0.03$. We ran three alternative CFA's with the factors combinations combined—fairness and work, fairness and life, and work and life, and these were all a significantly

(all $p < .001$) poorer fits to the data (compared using chi square difference tests—Hair et al. 2010).

While the EFAs suggest each country saw the three constructs around fairness, work and life similarly, we also conducted a test for metric invariance to confirm this nature. Hence, we ran a multi-group CFA analysis to test for measurement invariance (Bou and Satorra 2010). This would confirm respondents from New Zealand and South Africa answered the survey items in the same way. We followed the approach of Haar et al. (2014) and compared the country levels across the RMSEA score, because this fit statistic is not affected by model complexity (Meade and Kroustalis 2006). The difference in RMSEA (constrained and unconstrained models) across the two countries was low (0.007), which is under the threshold offered by Cheung and Rensvold (2000). This finding of equivalent fit and scalar invariance affords assurance that the samples can be compared.

Based on these fit analyses and tests of invariance, we created three new variables for subsequent tests, FAIR, WORK and LIFE. FAIR and LIFE each had items whose scales were uniform, and we thereby calculated mean scores per item for these two factors. The items confirmed to be loading on WORK however had different scales (3-points and 10-point with no mid-point). Therefore, for WORK, we calculated factor scores with pairwise deletion in order to maximise sample size for each particular comparison, using EFA (effectively, standard scores).

Curve estimations

These were utilized to explore whether relationships between money on the one hand and fairness, work and life on the other, were statistically significant. We kept in mind that in exploratory research the focus is on avoiding false positives, i.e., closing down a research stream prematurely simply because the percentages of variance being explained were not initially high (Grimm 1993). Following Carr et al. (2016a, b), we explored linear, logarithmic, cubic and S regressions for degree of fit. In the New Zealand data, we did not analyse annual household, which was bracketed and thereby not a continuous variable, and we removed outliers for personal hourly rate from NZ\$ 40 per hour and upwards ($n = 9$, ranging up to NZ\$ 120 per hour, total useable $N = 139$). In South Africa, we removed potentially curve-distorting outliers at or above household SAR 40,000 per month ($n = 21$, ranging up to SAR 150,000; $N = 317$) and monthly salary ($n = 17$, up to SAR 125,000; $N = 336$).

In New Zealand, there was a statistically significant degree of fit hourly rate and FAIR and WORK on all four types of function, with cubic being the best fitting function (R square = 0.057 and 0.167, respectively for FAIR and WORK; $F = 2.715$, $df = 3$, $p = .047$; $F = 9.010$, $df = 3$, $p < .001$). There was no significant link between hourly rate

and LIFE. Hence, this variable was dropped from subsequent analyses.

In South Africa, for household income (monthly), a similar pattern emerged, with a cubic function explaining respectively 7.7, 20.7 and 9% of the variance respectively in FAIR, WORK, and LIFE ($F=8.650$, $df=3$, $p<.001$; $F=27.245$, $df=3$, $p<.001$; $F=2.975$, $df=3$, $p<.001$). Monthly personal salary was most closely linked to FAIR in a cubic function (9.9%; $F=12.148$, $df=3$, $p<.001$) to WORK, in either a cubic (18.8%; $F=25.578$, $df=3$, $p<.001$) or logarithmic (19.1%; $F=78.638$, $df=1$, $p<.001$) function, and non-significantly to LIFE. Hence for South Africa, we retained LIFE for household income but not for personal salary.

LOESS curve fitting

A risk in any curvilinear regression process is over-smoothing, in which some of the essential variability in a dataset is unintentionally overlooked (Cleveland 1979). This can happen if any relationship between variables is complex, for example by having multiple cusps (Fig. 1, solid blue line). One approach to minimising such risk consists of applying Locally Estimated Scatterplot Smoothing (LOESS). Well suited for exploratory research (Cleveland and Devlin 1988), LOESS is a ‘locally estimated’ form of regression because curves are fitted “only to those observations in a neighbourhood of x ” (Cleveland and Loader 1996, p. 2). Conceptualized as a “sliding window” which moves along the x -axis of a scatterplot, stopping and estimating separate regression equations (and points of inflexion) per stop, LOESS regressions involve only the data points that fall within the window. They precisely allow estimated slopes to change, and thereby can potentially detect, and trace, quite complex contours within any relatively complex dataset as a whole (Jacoby 2000, p. 584).

Termed a tension parameter, the width of the sliding window is determined by the proportion of observations that are used in each local regression. At 100% (as in our curve estimations above), the risk of over-smoothing is at its highest. As the tension parameter decreases from 1.0 towards 0, however, the risk of over-smoothing is replaced by potentially over-fitting (with overly interpolated, jagged lines). To counter such a risk, whilst at the same time maximizing potential to detect empirical patterns, Cleveland (1979) recommends starting with a tension parameter of 50% (0.5), and iteratively moving the tension parameter between 0.2 and 0.8. Thereafter, any decision about the most appropriate

tension parameter can really only be made on a case-by-case basis, scatterplot-by-scatterplot, using the general objective of producing a LOESS curve that is (1) as smooth as possible and (2) closer (compared to any previous curve estimations) to visible data patterns and clouds (Jacoby 2000, p. 586).¹

The resulting functions are presented in Fig. 2 (for household income, both countries) and 3 (personal salary/hourly wage, both countries). Variance in the data points about the LOESS curves shows that the data are noisy. This is to be expected in exploratory research. Our core focus was not now on ‘fit’ (see above for Sigmoidal fit statistics). Rather the “LOESS smoother differs from parametric fitting procedures (like OLS regression) in a fundamental way: it does not fit a particular, narrowly-defined model to the data. Therefore, the very concept of ‘goodness of fit’ is problematic. With a nonparametric smoother, the variance explained in Y is less important than the degree to which the resultant smooth curve follows the prominent features of the bivariate data. As a result, the R^2_{loess} is seldom reported in the results of analyses that employ the LOESS fitting procedure” (Jacoby 2000, p. 594).

For purposes of comparison, Fig. 2 includes the significant cubic functions from our previous curve estimates. Alongside these estimates and in accord with Cleveland (1979) and Jacoby (2000), we began with an initial tension parameter of 0.5, and thereafter progressively slid the regression window (tension parameter) up and down between the ranges 0.2 and 0.8, looking carefully and specifically for any changes in curvature and cusp that departed from the smoothed cubic curve, without becoming over-jagged. Broadly speaking, the localised curves depicted in red (Fig. 2) held consistently over a range of tension parameters below 0.8 and above 0.2. We have therefore presented the least jagged of these localised, i.e., differentiated curves, which by definition add information to the standard curve estimates, which as we have seen may be over-smoothed.

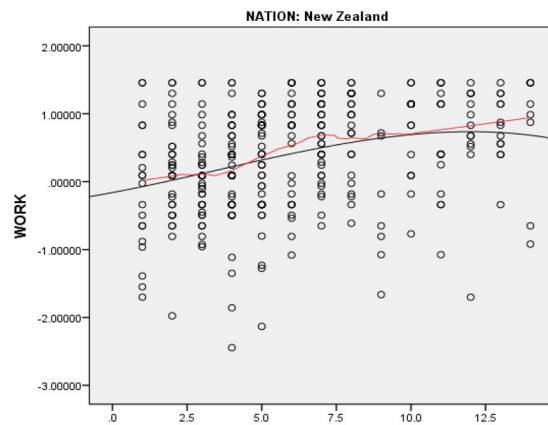
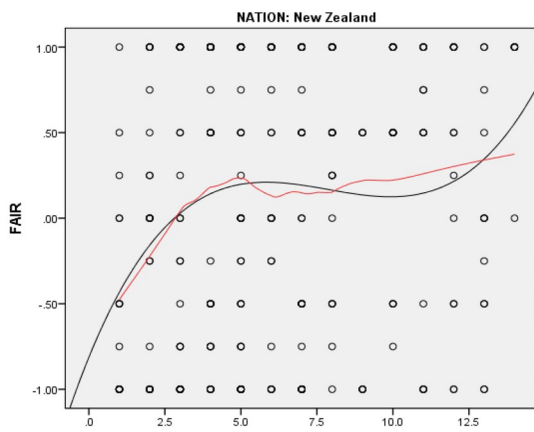
In New Zealand, the localised curves for FAIR and WORK followed a similar pattern as the cubic functions did, i.e., rise-pause-rise. However, the slopes and inflexions were not quite as over-smoothed as the plug-in cubic functions had implied. Also, they do appear to pass somewhat closer to, and partially through data clouds (for FAIR in South Africa, and WORK in both countries). In New Zealand, there was a noticeable flat-line (for WORK) through the lowest household income brackets (up to NZ\$40Ks annual household income). For the income brackets along that line, WORK (quality of work life) tended to be rated at

¹ LOESS procedures also have differing “kernel functions,” which

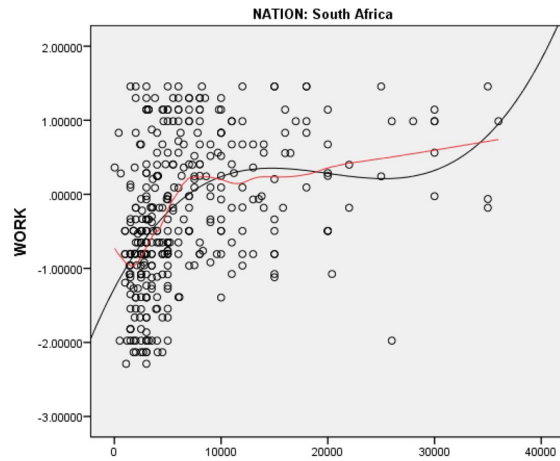
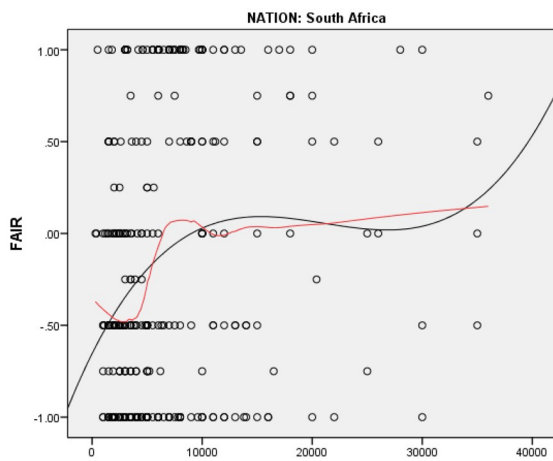
vary the weightings on the closest versus extreme data points, relative to the current point of estimation. We varied this function across all seven of the major alternatives but found little or no difference across any of them, for any given pair of variables. We therefore report

Footnote 1 (continued)

results from the relatively balanced SPSS default option, Epanechnikov (IBM 2014).



Income brackets 1=<10K, 2=10Ks, 3=20Ks...10=90Ks, 11=100-119K, 12=120-149K, 13=150-199K, 14=>200k



Income in SAR

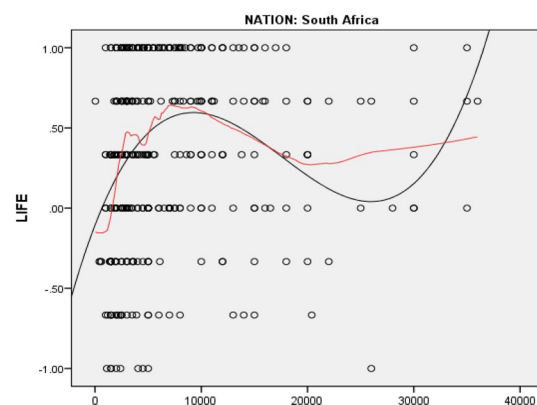
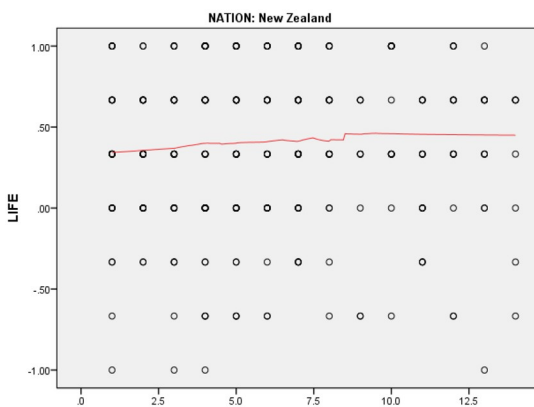


Fig. 2 FAIR WORK and LIFE as a function of HOUSEHOLD income. Note: tension parameter settings left-to-right, top-to-bottom = 0.50, 0.35, 0.55, 0.40, 0.50, 0.25

‘0.’ Such flatness and failure to rise into positive affect suggests a poverty trap (Refer to the “Introduction” section). This flat tail is more visible in South Africa, where we have seen already that hardship is generally more severe. In addition to an overall pattern of rise-pause-rise, in the South African setting there was a clearer S-shape in the red lines, across both FAIR and WORK, at the lowest income brackets. The shape in Fig. 2 was very similar to the solid blue line in Fig. 1, which indicates a poverty trap.

In Fig. 2, we have also included links between household income and LIFE satisfaction. The curve estimation for New Zealand was not significant (and is not therefore included). The LOESS regression too indicated no relationship (Fig. 2). For South Africa however, there was again a significant cubic function, plus a more differentiated pattern of flat-rise-pause-rise, albeit with a smaller flat tail at the lowest income bracket (compared to the household income data for South Africa).

Summing up from Fig. 2, there were clear similarities between the shapes of each function across FAIR, WORK and LIFE (South Africa only): There was a reasonably consistent and recurring pattern of rise-pause-rise; plus, consistent suggestions of a poverty trap, especially at the very lowest household income values. Thus, for household income, we found evidence of poverty traps *and* diminishing marginal returns.

In New Zealand, the household living wage pivot range was \approx NZ\$ 30 k (income bracket where the function crossed 0 on the y-axis) to NZ\$ 40 k. In South Africa, the key pivot range was approximately between SAR 4 k (when the curve visibly in Fig. 2 started to rise from poverty trap zone) to SAR 10 k (where the function crosses the mid-point/ $z = 0$). Just above NZ\$ 40 k household in New Zealand, and SAR 10 k in South Africa, there was a noticeable pause/dip in FAIR, WORK and LIFE, suggesting perhaps changed aspirations and possibly traces of a sense of relative deprivation (see “Discussion” section).

Figure 3 focuses on personal wage rather than household income reported by the working participant. The same pattern of rise-pause-rise, about NZ\$ 20 per hour and SAR 10 k, were again evident. Also, the evidence for any S-shaped poverty trap (i.e., *Trap-rise-pause-rise*) was more pronounced in the South African context. In both countries, the LOESS curves relating to FAIR and WORK again crossed the mid-point of the y-axis (which was by definition the mean of the sample for WORK, due to the scaling being standard/ z -scores) at roughly the same point on the x-axis (money).

Potentially illustrative and informative of qualia were comments to our question “How is your wage working for you?” [see “Measures”; above]). In New Zealand, these ranged from “Hand to mouth” (NZ\$ 30 k household) to “survivable” (NZ\$ 40 k), to “Works well enough, still not

fair” (NZ\$ 50 k, into the pause/dip zone in Figs. 2, 3). From South Africa, mini-narratives of respondents earning below SAR 4 k per month included, for example: “I just feel like there is too much that needs to be done” (SAR 1.5 k); “My salary is very low and I am not satisfied at all: (SAR 2 k); “I can buy groceries and pay for rent but I cannot afford transport money to work” (SAR 3 k); “I had to make loans to afford basic needs” (SAR 3.5 k). Narratives of respondents earning above SAR 4 k per month included, for example: “Compared to what I used to earn, now I am stressed [sic] free” (SAR 35 k); “My wage is fair and I am satisfied with it” (SAR 9.5 k); “I ‘m satisfied with the wage I earn” (SAR 6 k); “My salary works well for me because I can afford to purchase grocery and some basic needs” (SAR 12 k). Above 12 k SAR, we had comments such as, “After deductions I would buy food and send money home and be left with nothing” (SAR 14 k monthly); “I am not affording entertainment” (SAR 14 k); and, “It is balancing my needs. Better than nothing. I wish Department of Labour can check if companies are paying employees the market related salaries” (SAR 13.5 k). Such comments may partly reflect raised aspirations looking up the income curve with raised expectations for quality of life.

Structural equation modelling (SEM)

Finally, we ran an SEM model to test FAIRness as a predictor of WORK and of LIFE. The model was a good fit to the data (Williams et al. 2009) and the results from the combined sample were:

*FAIRness to WORK: path coefficient 0.37 ($p < .001$).

*FAIRness to LIFE: path coefficient 0.18 ($p < .001$).

Total variance (r square): WORK = 0.22.

Total variance (r square): LIFE = 0.09.

We then ran a multi-group SEM to test effects between the two samples:

*FAIRness to WORK: path coefficient 0.49 ($p < .001$) for South Africa and path coefficient 0.15 ($p < .001$) for New Zealand.

*FAIRness to LIFE: path coefficient 0.23 ($p < .001$) for South Africa and path coefficient 0.12 ($p < .001$) for New Zealand.

Total variance (r square): WORK = 0.33 for South Africa and 0.08 for New Zealand.

Total variance (r square): LIFE = 0.10 for South Africa and 0.07 for New Zealand.

Hence, while the effects are significant in both countries, the importance of fairness towards work capabilities was more prominent (path coefficient almost three-times the size) and accounted for more variance (more than four-times).

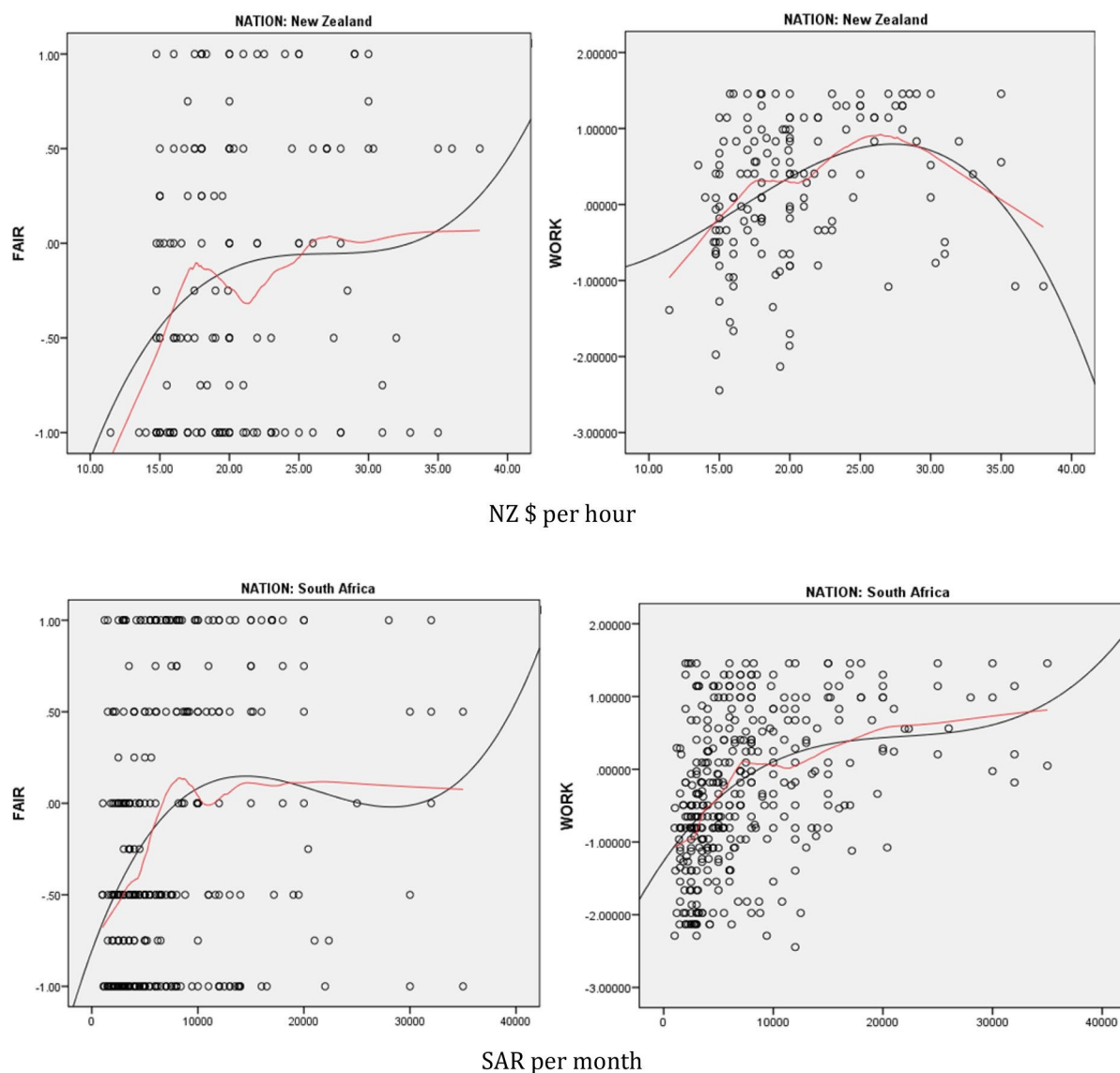


Fig. 3 – FAIR WORK and LIFE as a function of PERSONAL income. Note: tension parameter settings left-to-right, top-to-bottom = 0.50, 0.50, 0.45, and 0.35

Discussion

First, we found signs of diminishing marginal returns, notably across the middle sections of all curves as FAIR, WORK and LIFE scores climbed towards the mid-point/average. Second, we found visible evidence of a poverty trap at the very low ends of the household income range. This was visibly more apparent in South Africa where incomes were on average lower (current exchange rate = SAR 10 for NZ\$ one), and income inequality was higher (above). In addition, there was support in our data for the possibility that inequality moderates the links between income and sense of capability.

Post hoc, we converted our empirically estimated hourly living wage figures (NZ\$ 20 per hour in NZ and SAR 10,000 monthly) to monthly pay (assuming full-time work), using the latest available figures on Purchasing Power Parity (OECD 2016). This conversion, albeit approximate, and tentative, gave us a pivotal monthly personal income range of between PPP\$ 1787 (in South Africa) to PPP\$ 2182 (in New Zealand). Hence the living wage across both countries pivots about circa PPP\$ 2000 per month (+/-_circa 2000 PPP\$). Such comparisons are possible because our measures were invariant across cultures and economies.

As noted earlier, we sampled from low-income centres in all four cities, in both countries, and in that sense, it can-not simply be that the difference is due to, say, the poorer

segments of the urban population in South Africa rarely visiting such centres and thereby being under-sampled, implying that the true gap in “living wages” between the two countries is larger than estimated. Indeed, the similarity of shape in functions, and best fit functions from both curve estimation and LOESS regressions, across such diverse settings, suggests at least the possibility that what makes for quality of living wage in each setting falls within a relatively small living wage *range* (Yao et al. 2017; <https://youtu.be/zbZafHgqumo>).

As a set, our findings are supportive of the idea of a single wage-capability function, elongated leftwards into an S-shaped poverty trap in very low-income jobs and communities, and climbing steeply towards the sustainable livelihood levels. These data are broadly consistent with poverty trap theory and the law of diminishing returns. That the S-shaped curves (from South Africa) began to climb around SAR 3400, and crossed the mid-point/average at around SAR 10,000 monthly, is also broadly consistent with an announcement at the time (2016/2017) of a SAR 3,500 legal “Minimum” wage, which fell short of the SAR 10–12,500 “Living” wage being campaigned-for, at the time, by labour union organizations. More generally, the fact that we found similar patterns across not only different criterion variables, but also countries that are socio-economically, socio-culturally and socio-politically diverse, suggests some robustness in the findings (see “[Introduction](#)”, section).

Above the living wage threshold, or pivot range (Yao et al. 2017), we also found evidence of a pause, a dip in fact. This was somewhat unexpected but very consistent across countries and measures (Carr et al. 2016c). One interpretation for this dip may be relatively sociological—rising expectations and aspirations. Just below a living wage, one is nonetheless still perched at the higher end of the low-wage spectrum, whereas beyond the cusp, aspirations shift to look up the income distribution, placing oneself at the lower end of the upper income distribution.² In theoretical terms, this socio-economic comparison process might equally be termed from sociology, “relative deprivation,” “J-curve” or (from the Sociology of Community Development) “Have a little, want more” (Alinsky 1972; Jost and Mentovich 2016).

This point is a key reminder that an interesting and probably equally valid way of studying work, wage and wellbeing is to do so from a sociological point of view, focusing on social relations at work (between staff), in work related interactions and situations (employer/worker) and social relations beyond that (structures in a particular society) thus capturing the socio-economic characteristics and conditions of a specific setting, including a more in-depth discussion of individual experiences and structural conditions of the

social contexts. What the finding of a pause signals perhaps is a need for a greater understanding of shifting *expectations* alongside upwardly revised aspirations, once a pivotal living wage range is crossed. However, our data also suggest that any unrest may be short-lived, since the curve begins to rise again shortly thereafter (although with further diminishing marginal returns).

This last point reminds us of a key limitation in our study, which did not include time as a key variable. Clearly it would be premature to assume that a cross-sectional relationship can substitute for a longitudinal one. There is no guarantee that a person who earns a living wage on our graphs will automatically be on their way ‘up’ the income curve. For that kind of process to be inferred, future research will need to be panel-based, and conducted over several years, and possibly even decades. In that respect, we have formally recommended to the UN Social Commission that a major panel study of living wages, across countries, generations, and measures, be undertaken (GLOW/SIOP 2016).

In that prospective direction, the findings reported in this paper clearly imply the possibility of a global living wage range, expressed in PPP\$ (Yao et al. 2017). A systematic panel study such as we have proposed to the UN could help to inform living wage debates along global supply chains for generations to follow (<https://youtu.be/zbZafHgqumo>). It would further help to address the United Nations Sustainable Development Goals, which include the eradication of (working) poverty, and equal pay for work of equal value, i.e., pay fairness (United Nations 2016). Clearly it needs to include more on relative income, which we were not able to measure effectively (above). Addressing working poverty cannot be separated from addressing the maximum wage, and perhaps maximum-minimum ratios, that people are able to earn (ILO 2013). This study is but one step in that policy direction. As a trans-disciplinary lens, the living wage lens has a wider potential—to help structure a research and policy agenda that will cast light on all 17 of the UN SDGs (Table 1).

Conclusions and implications

This paper replicated and extended previous pilot research in New Zealand, by developing aligned and appropriate, reliable multi-item measures of quality of work life and life. It reports a new method of approaching the issue of working poverty, and the validity of living wage concepts. It extends this approach to a different setting, with lower incomes and higher inequality. It finds previously unexplored, complex relationships between wages and income on the one hand, and quality of life on the other. It reveals a consistent pattern across these diverse settings, indicating potential for further exploration with larger systematic samples. The point of this pattern is clear. Making living wages work requires staying

² We are grateful to Louella Carr for this suggestion.

Table 1 Map of SDGs to project GLOW (Global Living Organizational Wage)

SDG	Brief extract	Exemplar GLOW question
1	By 2030, eradicate extreme poverty for all people everywhere... Implement nationally appropriate social protection systems and measures for all, including floors...	1. Is there a Global Living Wage that enables people, organizations and communities to prosper and thrive?"
2	By 2030, end hunger and ensure access by all people, ... to safe, nutritious and sufficient food all year round... double the agricultural productivity and incomes of small-scale food producers	2. Do living wages for food producers & workers end hunger, and do they boost productivity & farm incomes?
3	Ensure healthy lives and promote wellbeing for all at all ages..	3. Do living wages boost mental and physical health for all at all ages?
4	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all... By 2030... increase youth and adults with relevant skills for employment, decent jobs & entrepreneurship..	4. Does having a living wage in the household boost lifelong learning opportunity over family generations?
5	Achieve gender equality and empower all women and girls... Recognize and value unpaid care and domestic work through... social protection policies ... Ensure equal opportunities for leadership	5. Do living wages close gender pay gaps, boosting job security and equitable access to leadership roles?
6	Ensure availability and sustainable management of water and sanitation for all...	6. Is there any link between access to living wages and access to clean water and sanitation?
7	Ensure access to affordable, reliable, sustainable and modern energy for all...	7. What difference can a living household wage make to access to clean affordable energy?
8	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all... Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro-, small- and medium-sized enterprises, including through access to financial service... Protect labor rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants and those in precarious employment...	8. Do living wages create or reduce jobs, do they reduce or enhance job quality, & do they lead to efficiency gains or losses? Do they enable the growth of or threaten small and medium enterprise development? Do they enable integration for migrant workers and refugees? Do they reduce precarious employment?
9	Promote inclusive and sustainable industrialization ... Increase access of small-scale... enterprises, in particular in developing countries, to financial services, affordable credit, and integration into value chains	9. Do living wages enhance employee and entrepreneur senses of inclusion at work, in society, & in value chains?
10	Reduce inequality within and among countries... ... Adopt policies, especially fiscal, wage and social protection policies, & progressively achieve greater equality... Facilitate orderly, safe, regular and responsible migration and mobility of people... through the implementation of planned and well-managed migration policies	10. Do living wages reduce inequality within and between countries? Do they enable equal opportunity and reduce discrimination? Do living wage policies enable integration?
11	Make cities and human settlements inclusive, safe, resilient and sustainable... By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums...	11. Do living wages reduce homelessness, enhance community safety, increase access to housing?
12	Ensure sustainable consumption and production patterns... taking into account the specific needs and conditions of developing countries and...in a manner that protects the poor and affected communities...	12. Does fair-traded produce (and goods) taste (and feel) better to the consumer? Does the consumer's living wage boost fair trade pricing, creating a positive livelihoods cycle?
13	Take urgent action to combat climate change and its impacts..Promote mechanisms for raising capacity for effective climate change-related planning & management in least developed & small island developing States, including women, youth, marginalized communities...	13. Is the living wage for women, youth and marginalized communities one such mechanism? Do living wages enable/foster gender equity?

Table I (continued)

SDG	Brief extract	Exemplar GLOW question
14	Conserve and sustainably use the oceans, seas and marine resources for sustainable development... By 2030, increase economic benefits to [SIDS] and least developed countries from sustainable use of marine resources including sustainable management of fisheries, aquaculture and tourism, access for artisanal fishers to marine resources/markets	14. Do living wages, e.g., for fisheries work forces, increase the quality and sustainability of work in SIDS, and do they help conserve marine resources & increase market access?
15	Protect, restore and promote sustainable use of terrestrial eco-systems, sustainably manage forests, combat desertification, and halt and reverse land degradation... Mobilize significant resources from all sources and at all levels to finance sustainable forest management and provide adequate incentives to developing countries to advance such management, including for conservation and reforestation... Enhance global support for efforts to combat poaching and trafficking of protected species, including by increasing the capacity of local communities to pursue sustainable livelihood opportunities...	15. Do living wages boost capacity to manage forests more sustainably? Do they reduce illegal poaching?
16	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective accountable and inclusive institutions at all levels...	16. Do living wages reduce conflict and enhance the sense of social justice in society?
17	Partnerships for the goals... Promote a universal, rules-based, open, non-discriminatory and equitable multilateral trading system under the World Trade Organization, including through the conclusion of negotiations under its Doha Development Agenda... enhance capacity-building support to developing countries, including for least developed countries and small island developing States, to increase significantly the availability of high-quality, timely and reliable data disaggregated by income, gender, age, race, ethnicity, migratory status, disability, geographic location and other characteristics relevant in national contexts ... By 2030, build on existing initiatives to develop measurements of progress on sustainable development that complement gross domestic product, and support statistical capacity-building in developing countries..	17. Contribute towards the global debate on working poverty, by providing high-quality timely and reliable data that may be disaggregated, and which provide innovative and socially responsive indicators that complement more macro level measures of progress on sustainable development and which support capacity building in lower-income settings

Source: Extracted and adapted from <https://sustainabledevelopment.un.org/?menu=1300>. Accessed Aug 20, 2016; and from Project GLOW (GLOW/SIOP 2016)

ahead of the curve, or more precisely at or above an empirically derived, locally determined cusp in the curve, where people begin to report positive quality of life, and work life. To the extent that sustainability science includes quality of life, the methods and observations reported in this paper may contribute towards a science of sustainable livelihood.

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