



Hidden costs of entering self-employment: the spouse's psychological well-being

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Abstract Spouses are known to play a critical supportive role for the self-employed, yet very little evidence is available concerning how entrepreneurial pursuits affect the spouse. The present analysis offers a contribution by evaluating short-term psychological well-being dynamics among spouses of individuals entering self-employment, using panel survey data from Australia. We construct matched control samples based on a range of relevant characteristics to mitigate selection bias and find that spouses of self-employed individuals report substantially higher levels of well-being before entry into self-employment and experience a modest but statistically significant decrease in well-being following entry. This is consistent with the hypothesis that self-employment demands substantial psychological capital from spouses. These patterns hold for both genders, with only moderate gender differences identified. In contrast,

spouses of those entering self-employment from unemployment report improvements in well-being.

Plain English Summary If contemplating self-employment, consider your spouse: Spouses of the self-employed report reduced psychological well-being following transition into self-employment. However, they report improved well-being if transitioning from unemployment. We compare the psychological well-being of spouses of individuals who enter self-employment with comparable others before and after transition. Spouses of self-employed individuals report substantially higher levels of well-being before entry into self-employment and a modest decrease in well-being following entry. This is consistent with the hypothesis that self-employment demands substantial psychological capital from spouses. These patterns hold for both genders, with only moderate gender differences identified. In contrast, spouses of those entering self-employment from unemployment report improvements in well-being.

Our results suggest would-be entrepreneurs should recognise the impact this may have on their spouses. Policymakers should and recognise the important role held by spouses and consider improving access to support services to assist the self-employed and their families.

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1 Introduction

Much effort is expended on understanding motivations and barriers for self-employment and entrepreneurship, due to its importance in the creation of employment and wealth (Baumol, 1996; Haltiwanger et al., 2008).¹ The self-employed represent a unique sub-set of the labour force; one whose needs for support are much less well understood, and whose access to state-funded family support is potentially limited, compared to the salaried employed.² The self-employed are found to enjoy greater autonomy, flexibility, and job satisfaction (Benz & Frey, 2004, 2008; Binder & Coad, 2016) and are reported to experience improved physical and mental health after transitioning into self-employment (Nikolova, 2019). On the other hand, entrepreneurial endeavour has also been shown to be costly and to place substantial demands on both practical and psychological resources (Parasuraman & Simmers, 2001). This, in turn, implies a greater need for support from families, and particularly spouses. Indeed, the self-employed have themselves been found to report greater levels of work-family conflict than the employed (Annink et al., 2016), though very little evidence is available representing the spouse's point of view (Wiklund et al., 2019). This paper seeks to address this void.

The literature on entrepreneurship suggests spouses play a critical role during transition into self-employment, providing both practical and emotional support (Danes et al., 2009). This support is particularly valuable during the entry into self-employment and enhances economic performance through the provision of a valuable "stress-buffering role" (El-Shoubaki & Stephan, 2018). Past research has linked spousal support to a variety of self-employment outcomes, including intention and entry (Kirkwood,

2009; Nikina et al., 2015), persistence and growth (Özcan, 2011), and business exit (Madanoglu et al., 2019). However, the literature has so far ignored the specific perspective of the spouse, and how transition to self-employment may affect their well-being. There are many potential stressors associated with self-employment, including long working hours and income insecurity, which are likely to affect the spouse, and thereby their capacity to continue to provide this support. As pointed out by Wiklund et al., (2019, p. 583), despite the potential for work and family crossover effects, "entrepreneurship research has overlooked work and family effects to date".

Insights into how self-employment affects the spouse can empower the self-employed to better harness their practical and emotional resources and, most importantly, avoid the problems associated with resource depletion and conflict. While several scholars have hypothesised a negative impact of self-employment on the spouse (El Shoubaki & Stephan, 2018; Jennings et al., 2013), these propositions have yet to be tested empirically. In this study, we aim to address this research gap and to make a contribution by examining the impact of entry into self-employment on the spouse's psychological well-being, using panel data from the Household, Income and Labour Dynamics in Australia (HILDA) survey.

We apply a difference-in-difference approach to evaluate the spouses' psychological well-being, as measured by mental health and satisfaction within key life domains, before and after entry into self-employment. Specifically, we evaluate the well-being for spouses of those who enter into self-employment (i.e. the treatment group) against that of spouses of comparable others who do not (i.e. the control group). We employ a matching procedure (entropy balancing) in order to improve comparability of the treatment and control groups and identify patterns which reflect meaningfully on differences and dynamics in spousal well-being (Hainmueller, 2012). Our study therefore complements and extends that of Nikolova (2019), who similarly evaluate the short-term health effects of becoming self-employment. Due to the gendered nature of division between work and family responsibilities within households, we also allow for gender differences in these dynamics.

We contribute to the literature in a number of ways. Drawing on crossover theory (Westman, 2001), we provide an insight into the inter-transmission of

¹ This sector of the economy, consisting predominantly of small-to-medium sized enterprises (SMEs), is a core component of the services sector in most countries, accounting for about 60% of employment and between 50 and 60% of value added across OECD countries (OECD, 2019). In Australia, from whence the data analysed here originate, around 2.3 million small businesses (with fewer than 20 employees) employed 44% of the workforce in 2019 (OECD, 2019).

² The present study considers self-employment in general, which extends beyond risk-taking entrepreneurial behaviour. For example, this may include farmers, trades people, and individual contractors.

job stress, psychological strain, and anxiety stemming from one partner's work demand to the other partner in the context of transition into self-employment. We propose that the self-employed experience work stresses which are conceptually and empirically different from the salaried employed (Wiklund, et al., 2018) and draw on crossover theory to evaluate the implications for spousal well-being. Second, by capturing several dimensions of well-being, we answer calls for more research on potential trade-off between mental health, general cognitive well-being (life satisfaction), and domain-specific satisfaction (marriage, financial situation, and leisure time) across life domains (Stephan, 2018). Third, we evaluate potential differences in self-employment motivated by opportunity versus necessity. Finally, we consider potential gender differences in crossover dynamics, as well-being of female spouses may be affected to a greater extent than male spouses because of the multiple social demands placed on women.

Our results provide strong and consistent evidence that spouses of the self-employed exhibit higher well-being than comparable others before transition into self-employment and experience reduced well-being in the period immediately following transition. These patterns are observed across all categories of well-being. In general, these well-being gaps therefore narrow during the sampling period, but often persist. These patterns are also surprisingly consistent across genders, with only few gender differences observed. Those who transition into self-employment from unemployment exhibit fundamentally different well-being dynamics vis-à-vis the control group, compared to those who transition into self-employment from employment. We again observe higher spousal well-being before transition, but a subsequent increase rather than decrease after transition. This pattern is, however, driven by female spouses. In general, we find little evidence in support of trade-offs between well-being categories, as well-being gaps and movements post-transition are generally consistent.

2 Background: theory and evidence

2.1 Crossover theory

Crossover theory focuses on how individuals' work-related stress and stressors affect other household or

family members, including the spouse (Westman, 2001, 2006; Bakker & Demerouti, 2013; Bakker et al., 2008, 2009; Amstad & Semmer, 2001). Crossover theory is based on mood convergence and emotional contagion phenomena (Bakker et al., 2009; Westman, 2001, 2006) to explain how partners tend to mimic each other's behaviours, attitudes, and emotions (Stevens et al., 2006).

Westman (2001, 2006) proposes three primary mechanisms involved in the crossover process. First, a direct empathetic reaction "either implicitly, by mimicking and synchronising the behaviour of others, and thus converging emotionally; or explicitly, by intentionally inducing emotions in others, or by trying to be empathic with others" (Amstad & Semmer, 2011; p. 45). This crossover occurs most frequently among couples who share most aspects of their lives to a significant extent ("your sadness, my sorrow") and may occur indirectly through mediating factors (e.g. special coping mechanisms, communication characteristics, social support, or social undermining). The last mechanism suggests that common spurious stressors experienced by both partners affect their well-being equally. For example, if the couple experience a common stressful life event, such as the loss of a close family member, or, in the context of self-employment, an imminent bankruptcy.

There is empirical literature demonstrating the crossover of psychological strains such as anxiety and burnout (Wickrama et al., 2019), work-family conflict (Burch & Burch, 2019), and relationship problems (Shimazu et al., 2009). However, these studies focus on dual-earner couples rather than self-employed, who are considered a distinctive occupational group.

2.2 Self-employment and spousal well-being

Launching a new business venture is a result of thoroughness and long-term determination. Consequently, it is widely acknowledged in the literature that self-employment commands substantial resources in the form of psychological capital (Hatak & Zhou, 2019; Reid et al., 2018). This concept, attributed to Avey et al. (2010), has been linked closely with well-being and refers specifically to "the psychological resources of efficacy, hope, optimism and resilience" (p. 17). As spouses often drawn in the discussion and planning for the business launch, these demands may well extend to them and other family members (Bakker

et al., 2009), requiring them to cope with additional stress. In her review on entrepreneurs' well-being, Stephan (2018) pointed out that psychological capital traits and traits associated with entrepreneurship such as risk-taking, internal locus of control, and the Big Five personality traits have beneficial effects on entrepreneurs' well-being.

There is also evidence that self-employment attract people (both the entrepreneurs and their spouse) in part because they perceive their personal skills, characteristics, and motives as being aligned with the requirements of that occupation. In this respect, the capacity to tolerate and manage stress is as a key determinant for self-employment. Baron et al. (2016) suggest that both environmental and self-selective factors play a role to attract people in self-employment with solid well-being and, specifically, a capacity to deal with stress. For example, many stakeholders (e.g. venture capitalists, business angels, incubators) pay a lot of attention to entrepreneurs' stamina and their ability to mentally cope with uncertainty, challenges, and adversity. In addition, the popular press and established literature have brought to light that setting up a business requires time and energy and that a high proportion of new businesses fail. Self-employment is therefore most likely to attract people who shy away from nine-to-five jobs and who understand their personal capacity to cope with stress.

Prior research has demonstrated that the self-employed face working conditions that are more extreme than salaried employees, as they specifically experience higher role ambiguity and volatility, more intensive time pressures, and longer working hours (Hatak & Zhou, 2019; Stephan, 2018). During the transition phase, the self-employed often assume multiple roles and manage a variety of stakeholders (customers, suppliers, banks, employees). This combination of roles and responsibilities often lead to high emotional demands and can lead to psychological burnout (Wach et al., 2020).

Spouses are particularly susceptible to the emotional hazards of work-family interference which are intensified by the fuzzy work boundaries experienced by the self-employed (Hagqvist et al., 2018). This extends beyond mere working hours, to include financial and psychological resources. For example, the family home may be used as collateral to secure a business loan, a move which can exacerbates the financial stress experienced by the spouse. Indeed,

managing family demands as a result of the spouse's inability to contribute and participate can lead to what is known as "spousal burnout syndrome" (Ekberg et al., 1986).

In summary, self-employment tends to attract people with above average capacity to tolerate stress, and it can place ongoing constraints on scarce spousal resources, including time, attention, and money (Gudmunson et al., 2009). In other words, the costs of self-employment extend beyond the explicit and implicit costs faced by the self-employed alone. Spouses will also face new financial and non-financial constraints, as well as uncertainty, which may negatively affect their well-being. We therefore hypothesise that entry into self-employment may be conditional upon the spouse exhibiting high levels of psychological capital prior to transition, which may the subsequently deplete during and immediately after transition.

2.3 Potential gender differences

The effect on self-employment on spousal well-being may be gender-specific, due to differences in gender roles and attitudes (Danes et al., 2013; Gupta et al., 2009; Kirkwood, 2009; Liang & Dunn, 2003, 2009; Padovez-Cualheta et al., 2019). Aside from real or perceived differences in values, communication style, and psychological coping strategies, women tend to face higher expectations in terms of caring responsibilities, including parenting (Boz Semerci & Volery, 2018), which is likely to present a burden on family communication and a constraint to work-life balance.

In the same vein, there are gender differences in the motivations for self-employment. Females tend to organise their lives around the needs of their families, while males tend to organise their lives around the demands of their work. Baines and Wheelock (1998) remark in this respect that "a woman who founds a business is not creating a separate economic entity but integrating a new system of business related relationship into her life" (Baines & Wheelock, 1998; p 18). These interconnections between the business interests and family interests are likely to affect the partner's morally and emotionally in a significant way.

Previous research also suggests gender differences in giving and receiving spousal support (Danes et al., 2013). Male entrepreneurs more often seek instrumental support (e.g. assisting with business tasks,

bookkeeping), while female entrepreneurs seek emotional support (e.g. listening empathically to the partner's concerns). These differences could create different expectations, and the gap between expectation and the actual spousal support received could create tension between partners and result in negative well-being. In fact, Kirkwood (2009) found that females look to their husbands for business advice and encouragement and consider the effects that starting a business may have on their spouse, whereas males tend to assume support is forthcoming and often start businesses without explicit spousal support. This leads us to consider gender differences in well-being of spouses of the self-employed, and we posit that hypothesised patterns may be more pronounced for female spouses than for male spouses.

2.4 Motivation for self-employment

Motivation for self-employment is likely to play an important role in how transition affects spouses. The literature traditionally distinguishes between individuals who are unemployed before starting businesses as “necessity” self-employed and define individuals who are not unemployed (i.e. salary workers, enrolled in school) before starting businesses as “opportunity” self-employed (Fairlie & Fossen, 2019). This opportunity-necessity differentiation, also referred to as push–pull, is one of the longest standing conceptualisations of self-employment motivation.

Well-being has traditionally favoured a pull motive into self-employment, where desire for independence, achievement, status, or recognition drives enterprising intention and action. A systematic review on entrepreneurial well-being finds that self-employed who may be broadly characterised as opportunity-motivated self-employed experienced higher well-being than necessity-motivated self-employed (Stephan, 2018), though a more nuanced approach may be required. While opportunity self-employed usually display higher family and health satisfaction than necessity self-employed, both types of self-employed have been found to be equally dissatisfied with the lack of leisure time (Binder & Coad, 2016). Nikolova (2019) suggests the necessity self-employed experience improvements in their mental health: necessity-based self-employment could provide not only a livelihood but also well-being gains to those who escape the misery of joblessness, which has been found to affect spouses almost as strongly as the

directly affected (Marcus, 2013). Opportunity-based self-employment may improve well-being if it brings autonomy and flexibility. In addition, being your own boss can provide non-pecuniary benefits from work arising from procedural utility (Benz & Frey, 2004): autonomy is valued beyond outcomes as a good decision-making procedure. In their study drawing on the Global Entrepreneurship Monitor in 70 countries covering 159,274 individuals, Amorós et al. (2021) find that necessity-motivated self-employed report well-being levels similar to opportunity-motivated self-employed.

Entering self-employment may therefore lead to higher levels of subjective well-being (i.e. by providing an income and fulfilling basic psychological needs such as autonomy, competence, and relatedness) for both necessity and opportunity-driven self-employed (Nikolova, 2019). However, the gain could be greater in terms of subjective well-being for necessity-motivated self-employed and their spouse. They may derive additional psychological benefits through the improved job security, income, and sense of control. These benefits could affect the spouse as part of the crossover process. We therefore posit that spouses of the necessity employed may be positively affected by transition into self-employment.

In sum, we evaluate three main hypotheses:

H1: Spouses of individuals who enter self-employment from paid employment exhibit (a) high levels of well-being before entry and (b) reduced well-being after entry;

H2: Spouses of individuals who enter self-employment from unemployment exhibit improved well-being after entry; and

H3: The patterns described in H1 and H2 will be more pronounced in female spouses.

3 Method of analysis

3.1 Methodological approach

The objective of the analysis is to evaluate the well-being of spouses whose partners enter into self-employment before and after transition (the treatment sample), vis-a-vis the well-being of comparable others (the control sample). Because treatment is non-random, we employ a matched difference-in-differences (MDiD) approach. This ensures that the control

sample matches the treatment sample as closely as possible, in order to avoid comparability issues arising from selection bias. This quasi-experimental method is frequently used to emulate a randomised controlled trial design applied to survey data, as seen in Freier et al. (2015), Marcus (2013), and Nikolova (2019).³

We apply a matching strategy for the treatment and control samples in order to facilitate meaningful comparison and avoid selection bias. This entails manipulating the control sample to match the treatment sample in terms of key demographic and other characteristics. Our preferred strategy for constructing the matched control sample is entropy balancing (Hainmueller, 2012; Hainmueller & Xu, 2012), which works by imposing a set of weights to balance pre-treatment covariates based on three moment conditions (i.e. mean, variance, and skewness) between treated and non-treated couples, generating a sample where the covariate balance is maximised. An alternative approach is propensity score matching, though previous econometric literature suggests that entropy balancing is a superior method, as it is more efficient and prevents loss of data (Hainmueller, 2012; Hainmueller & Xu, 2012).⁴

Equation (1) presents a general model used for the analysis, which is a standard difference-in-difference specification.

$$Y_i = \beta_0 + \beta_1 Treat_i + \beta_2 Post_i + \beta_3 (Treat \times Post)_i + \beta_x X_i + \beta_z Z_i + \beta_{HH} HH_i + \varepsilon_i \quad (1)$$

Here, Y_i is the well-being of individual i (the spouse). The variable $Treat_i$ is a dummy indicator, taking a value of 1 for individuals who are in the treatment group (i.e. spouses of individuals transitioning from being an employee to being

self-employed) and 0 for those in the control group (i.e. comparable other spouses). The $Post_i$ variable is a time dummy indicator which takes a value of 1 if the observation is a post-entry and a value of 0 if it is pre-entry. The parameter β_1 captures the differences in well-being between the treatment and control group pre-entry, which is of specific interest here. The parameter β_2 captures the change in well-being observed for the control group between the two periods (i.e. the counterfactual or comparison effect), and the interaction term coefficient β_3 captures the change in spousal well-being for individuals transitioning from being an employee to being self-employed, vis-à-vis the change observed for the control group over the same period (i.e. the average treatment, or difference-in-difference, effect). This parameter will be 0 if the change in well-being is no different between the treatment and control groups. Vectors X_i and Z_i represent sets of variables that capture individual characteristics for both the spouse and of the individual entering self-employment, respectively, and include potential confounders such as demographics and educational background. The vector HH_i contains couple and household characteristics that are common to both partners and includes state and year fixed effects, to capture potentially important differences in macroeconomic conditions. ε_i is the idiosyncratic error term. This method is employed for all individuals in the sample, as well as separately for male and female spouses, after recalculating the entropy balancing to suit.

The base configuration considers the spousal well-being associated with so-called opportunity entrepreneurs, vis-à-vis others who do not report changes in their employment. Further, we generate estimates for Eq. (1) using two alternative sample configurations. First, we compare the spousal well-being effects of transition into self-employment to that of transition between different jobs, which is also known to be stressful (Boswell et al., 2005). This allows us to specifically distinguish the effect of transitioning into self-employment from the general well-being effects associated with a job change. Second, we consider the spousal well-being effect for those transitioning from unemployment into self-employment (so-called necessity entrepreneurs, Fairlie & Fossen, 2019), for whom transition may reduce stress rather than increase stress.

³ Freier et al. (2015) examined the effect of graduating from university with an honours degree on later earning by using the University Graduates Panel. Marcus (2013) examined the effect of a husband's or wife's job loss by the plant closures on his or her spouse's mental well-being by using the German Socio-Economic Panel. Nikolova (2019) examined the effect of entrepreneurial entry on the individual's mental and physical health using German Socio-Economic Panel.

⁴ In order to evaluate whether our results are sensitive to the matching strategy, we conduct robustness tests using a control sample based on propensity score matching.

Consequently, in the first alternative configuration, the control group is replaced by spouses of individuals who report a change in employer between treatments periods, and in the second alternative configuration, the treatment group is replaced by spouses of individuals who enter self-employment from unemployment. The matching procedure is performed separately for each configuration.

The observed average treatment effect (i.e. β_3 in Eq. 1) is considered here specifically in the context of the selection effect (i.e. β_1) as well as the pure time effect (β_2). We also emphasise our focus on short-term dynamics.⁵ Generally, the interpretation of the key model parameters estimated using Eq. (1) rests on various assumptions. DiD method is typically applied to estimate the average effect of a randomly assigned treatment, though random assignment is often neither feasible nor (arguably) necessary—as is the case here. Causal inference requires that, in the absence of treatment, the treatment group would follow the same trend in well-being as the control group (i.e. the parallel trend assumption). Problems would therefore emerge if the treatment and control groups were exposed to different internal or external conditions during the treatment period, which could be caused by differences in demographic characteristics (e.g. younger versus older couples) to different macroeconomic conditions.⁶ Again, a successful matching procedure, and the inclusion of control variables to account for as many confounding such differences

as possible, ought to mitigate these concerns.⁷ In addition, the two alternative configurations are helpful in understanding the source of observed treatment effects.

Due to the importance of sample matching and model specification in ensuring meaningful comparison, we evaluate the robustness of our key results using apply several alternative matching procedures and a range of additional controls, including personality characteristics, risk preferences, and macroeconomic conditions. We also estimate Eq. (1) using unmatched samples to evaluate how matching affects our results.

3.2 Data and sample configurations

We draw on the first 16 waves of the Household, Income and Labour Dynamics in Australia (HILDA) survey, which is a large and broadly representative household-based panel. The first wave of the HILDA survey started in 2001 and included 13,007 individuals in 6753 households (for more detailed information about the HILDA, see Wooden & Watson, 2007). Consistent with prior practice (Kunze & Suppa, 2018; Nikolova, 2019; van der Zwan et al., 2018), we observe occupational change into self-employment status between two survey waves.⁸ Self-employment includes all types of entrepreneurs whether or not they have incorporated their businesses.

⁵ Our approach could usefully be extended to include longer-term dynamics, both leading up to and following transition into self-employment. However, this requires more careful consideration and falls outside the scope of this present study. We therefore maintain our focus on short-term dynamics, consistent with Nikolova (2019).

⁶ Relatedly, the allocation of treatment should be unrelated to the outcome. In this context, this means that change in spousal well-being must be independent of the treatment taking place. The counterfactual here would therefore be a situation where individuals' propensity to transition into self-employment is determined by changes in well-being reported by spouses. While we consider this unlikely, we cannot rule out this type of dynamic and invite readers to take this possibility into consideration when interpreting our results. A further requirement is Stable Unit Treatment Value Assumption, both in terms of consistency in the construction of treatment and control samples in repeated cross-sections and the absence of spillover effects in treatment. Neither is considered likely to be problematic in this context.

⁷ Our approach here follows Nikolova (2019), who makes a similar argument. A “placebo” treatment analysis is sometimes performed as a robustness test. This typically entails carrying out the analysis using a different time period, often just prior to the treatment window, as seen in Marcus (2013), who considers the effect of unemployment caused by plant closure (assumed random) on the mental health of spouses. As in the case of Nikolova (2019), such a placebo test is difficult to apply to this context, because of the non-randomness of the treatment. Transitions into self-employment are an anticipated choice event, and one which is likely to be planned far in advance. This therefore remains a limitation, though one which we hope is mitigated (partly or fully) by means of a carefully constructed matching procedure, and the inclusion of appropriate controls.

⁸ This means we do not include spouses of individuals who enter self-employment but who exit again before the next survey wave. This, however, might be considered a strength rather than a limitation, by avoiding a potential source of upward bias to our estimates. We are grateful to an anonymous referee for identifying this point.

Couples are matched via a unique spouse identifier in our sample. Our analysis includes couples who are legally and de facto married (i.e. partners living together on a genuine domestic basis under the Australian Family Law Act). We restrict the sample to include those aged under 65 years to avoid any potential effect of retirement on well-being. Couples who divorce or become widowed during the sampling period were omitted from the sample (constituting about 5.5 and 7.5% of the control and treatment groups, respectively) in order to focus on the short-term dynamics in well-being before and after transition to self-employment and spousal well-being. We also exclude 26 spouses where both partners entered self-employment in the same period (1.1% of the treatment sample).

Proceeding with the entropy balancing and following the identification strategy of Freier et al. (2015), Marcus (2013), and Nikolova (2019), we classify seven 2-year treatment periods from 2002 to 2016. In each period, individuals are placed in the treatment category if their spouse made the transition into self-employment. This excludes individuals who themselves are self-employed and those who exit self-employment during the sampling period. For example, the spouse of someone who entered into self-employment from paid employment between the two waves 2002 and 2003 and stayed self-employed in the following wave (2004) is placed in the treatment group for the 2002–2004 periods. Further, data was organised around a “floating baseline” methodology and centred on the year of the transition into self-employment over all seven treatment periods.⁹ As shown in Table 1, the resulting treatment sample consists of 2242 spouses (65.6% female) of individuals who enter into self-employment at some point over the sampling period and 133,284 spouses (50.1% female) of individuals who do not change employment status. The sample construction and configurations are illustrated in Fig. 1.

3.3 Psychological well-being measures

In line with the relevant literature, we take a broad perspective of psychological well-being as

encompassing several complementary dimensions (Wiklund et al., 2019; Amorós et al., 2021; Nikolova, 2019; van der Zwan et al., 2018).¹⁰ We include using five specific indicators, encompassing a mental health index, satisfaction with life in general, and satisfaction with four specific life domains considered particularly relevant to this context: marital relations, amount of leisure time, and financial circumstances. These indicators are listed, and briefly described, in Table 2.

The Mental Health Component Scale (MCS) is part of the SF-36 short form of medical health questionnaire, which is a commonly used survey instrument for measuring health. The scale is computed based on the respondent’s score across four specific sub-categories (role emotional, mental health, social functioning, and vitality). The score computation was subjected to tests of longitudinal invariance to confirm that the measure is indeed stable over the study period. The average variance extracted (AVE) for all measures was greater than 0.50. Cronbach’s alpha (MCS = 0.83) was indicative of strong psychometric properties. The scores on MCS were standardised to have a mean of 50 and standard deviation of 10 to ease the interpretation of the results, according to convention among survey data users. A higher score represents better mental health.

The HILDA survey includes a set of subjective well-being measures, where respondents are asked to rate their satisfaction with life in general, as well within a range of specific life domains, including marital, financial, and leisure satisfaction, to reflect domains where spouses are most likely to be affected by entry into self-employment. Responses are provided on a scale from between 0 (completely dissatisfied) and 10 (completely satisfied). These single-item measures of well-being are widely used in empirical literature. In fact, some argue that these global measures are as robust as the more psychometrically established multiple-item scales, since individuals are capable of balancing various characteristics to reach an overall assessment of the

⁹ A staggered DiD design is a possible alternative, though this poses problems for sample matching, which is a key attribute of this analysis.

¹⁰ We therefore specifically follow Wiklund et al., (2019; p. 581), who in a similar context argue “well-being should be considered an umbrella term that reflects multiple dimensions instead of capturing something unidimensional”.

Table 1 Sample descriptions

	Base treatment sam- ple (a)	Base control sam- ple (b)	Alternative control sample (c)	Alternative treatment sam- ple (d)
Total sample size	2242	133,284	14,697	1082
Female spouses (proportion)	0.656	0.501	0.485	0.555
Male spouses (proportion)	0.344	0.515	0.515	0.445
Key demographic profiles:				
<i>Affected spouse</i>				
Age (years, mean)	44.27	47.2	41.09	45.09
Completed year 12 (proportion)	0.124	0.145	0.132	0.101
Trade qualification (proportion)	0.387	0.388	0.341	0.398
Tertiary education (proportion)	0.352	0.388	0.389	0.315
Migrant (proportion)	0.265	0.222	0.227	0.315
Income (log, mean)	10.77	11.17	10.85	10.9
Tenure (years, mean)	8.663	11.84	5.091	9.18
Long-term health condition (proportion)	0.211	0.386	0.211	0.202
Weekly working hours (mean)	11.68	19.4	15.25	19.22
<i>Entrepreneurial spouse:</i>				
Age (mean)	44.17	47.04	41.12	43.9
Completed year 12 (proportion)	0.119	0.148	0.150	0.112
Trade qualification (proportion)	0.327	0.361	0.340	0.328
Tertiary education (proportion)	0.391	0.335	0.350	0.303
Income (log, mean)	10.82	10.77	10.180	8.64
Long-term health condition (proportion)	0.196	0.377	0.213	0.187
<i>Couple level:</i>				
Marital duration (years)	16.07	19.01	13.05	15.64
Number of dependent children < 15	1.07	1.374	1.174	1.247
Location (1 = major urban, 0 = other)	0.593	0.684	0.656	0.593
Home ownership (1 = yes, 0 = no)	0.844	0.904	0.797	0.838

Key statistics are provided, pre-matching, for four samples consisting of spouses of individuals (a) entering into self-employment, (b) with no change in employment status, (c) who move across employers, and (d) who enter self-employment from unemployment. Table A2, provided in the appendix, also provides information on individuals dropped from the sample (divorced, widowed, both partners self-employed), as well as industry. *T*-statistics for mean differences across samples are reported in Table 3

quality of these well-being domain-specific items (Binder, 2018; Binder & Coad, 2016; Kristoffersen, 2017; Lee et al. 2019; Schneck, 2014). Furthermore, these subjective dimensions of well-being are less sensitive to short-term emotions and moods (Binder & Coad, 2016). The specific satisfaction measures included here are chosen to capture subjective evaluations of well-being within domains which are hypothesised to affect spouses of the self-employed.

3.4 Other key variables

3.4.1 Conditioning variables for matching

In order to optimise the control group (i.e. the counterfactual), we matched couples based on the pre-treatment characteristics of both the affected spouse and the entrepreneurial spouse, as well as the aggregate household characteristic. These characteristics include age, education level, labour force

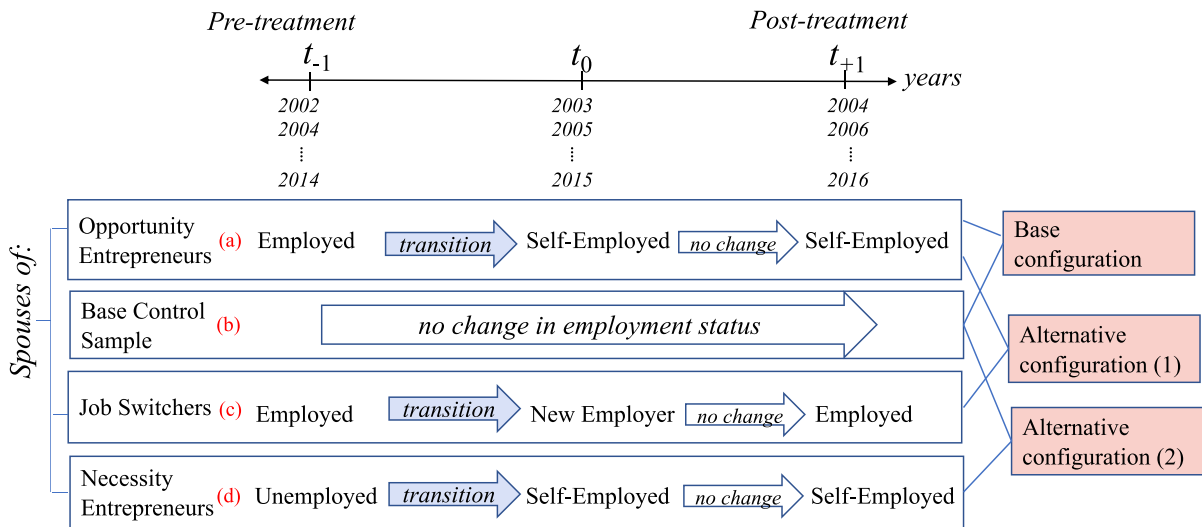


Fig. 1 Diagram of sample construction and configurations

Table 2 Definition and measurement of the dependent variables

Variable	Description
Mental Health Component Scale	Computed based on the respondent's score on: (1) role emotional, (2) mental health, (3) social functioning, (4) vitality. The score is standardised to have a mean of 50 and standard deviation of 10. Higher scores correspond to higher mental health
<i>Role emotional</i>	Computed based on the respondent's score on the following question: During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of your emotional problem? (1) Cut down the amount of time spent on work/other activities; (2) accomplished less than would like; (3) didn't do work/other activities as carefully as usual
<i>Mental health</i>	Computed based on the respondent's score on the following question: How much of the time during the past 4 weeks did you felt the following: (1) Been a nervous person; (2) felt so down in the dumps nothing could cheer you up; (3) felt calm and peaceful; (4) been a happy person; (5) felt down; based on a 6-point Likert scale from (1 = All of the time) to (6 = none of the time)
<i>Social functioning</i>	Computed based on the respondent's score on the following question: emotional problems interfered with normal social activities
<i>Vitality</i>	Computed based on the respondent's score on the following question: How much of the time during the past 4 weeks did you felt the following (All of the time) to (none of the time): (1) Have a lot of energy; (2) feel full of life; (3) felt worn out; (4) felt tired
Life satisfaction	On 10-point Likert scale: "All things considered, how satisfied are you with your life?" Higher scores correspond to higher level of satisfaction
Marital satisfaction	On 10-point Likert scale: "How satisfied are you with your relationship with your partner?" Higher scores correspond to higher level of satisfaction
Financial satisfaction	On 10-point Likert scale "How satisfied are you with your financial situation?" Higher scores correspond to higher level of satisfaction
Leisure satisfaction	On 10-point Likert scale: "How satisfied are you with the amount of free time you have?" Higher scores correspond to higher level of satisfaction

participation (working hours), migration status and background, long-term health condition, marital duration, number of children, income, home ownership, and location. Migration background is included

as a proxy of cultural capital, as migrants often exhibit strong social capital (Nowok et al., 2013), which is a resource that could buffer against stressful events. Long-term health condition is controlled to

eliminate any effect these health conditions may have on well-being (Clark et al., 2008). Marital duration is included in order to account for the extent of sharing of common household environmental influences and numerous aspects of lifestyle which could affect well-being (Butterworth & Rodgers, 2006). The number of children in the household is included in order to account for the effect this has on caring responsibilities (Dockery & Bawa, 2018). Home ownership is included as a proxy for wealth. Finally, location in terms of urban or rural area is included as this is found to have an effect on how people form and maintain their social network, including their marriage (Haapanen & Tervo, 2009).

3.4.2 Control variables

In addition to the variables used for the entropy balancing procedure, the MDiD model includes controls for employment status and life events for the affected spouse. The affected spouse's labour participation and earnings affects the financial and practical feasibility of the transition into self-employment (Jennings et al., 2013). Spouses' paid employment could provide income stability during the launching period until the new business venture is profitable (Jennings et al., 2013). Planned and unplanned life events (positive and negative) are accounted for in the model, consistent with research demonstrating the effects of such personal shocks on life satisfaction and mental health. Finally, we include a full set of survey year and states dummies to account for effects stemming from overall economic conditions and location. A full list and descriptions of these variables are provided in Table A1 in the appendix.

Table 3 presents key characteristics of the treatment and control groups before and after the entropy balancing for the base sample configuration. The treatment group comprises 2242 spouses, with females being overrepresented (65.6% of these spouses are female and 34.4% are male).¹¹ These samples are statistically different across several characteristics, before matching. The treatment group is

slightly younger on average (by about 3 years), and more likely to be migrants. Their educational profile is similar, but their income is slightly lower, potentially due to being slightly younger. Further, the average marital duration of the treatment group is less than the control group (by almost 3 years), consistent with the observed age difference. To ensure the overall quality of the matching, the standardised bias is calculated by taking the difference in means for any given covariate between the treatment and control groups and dividing by the standard deviation in the treatment group. This satisfies the crucial assumption that, conditional on the entropy weight, the treatment and comparison groups are comparable.

4 Results

4.1 Base configuration: spousal well-being before and after self-employment

Table 4 shows the baseline estimates of the MDiD model, represented by Eq. (1), for all well-being measures under consideration, with all control variables included.¹² Key estimates are visualised in Fig. 2.¹³ First, these results demonstrate that, relative to comparable others, as facilitated by the entropy balancing procedure, spouses of would-be entrepreneurs report better mental health, life satisfaction, marital satisfaction, leisure satisfaction, and financial satisfaction in the period directly *before* transition into self-employment. Second, reassuringly, we observe relatively weak time trends for the control group. Third, spouses report reduction in well-being across all domains following entry into self-employment, vis-à-vis the control group. In the case of marital and leisure satisfaction, there pre-treatment gaps

¹² Estimates with various specifications (containing no, partial, and full sets of control variables) and full estimates for the complete specification are provided in Tables 3 and 4, supplied with the online appendix. The inclusion of control variables tends to yield larger treatment group effects (β_1), weaker time effects (β_2), and stronger treatment time (DiD) effects (β_3). This is consistent with the intention behind including these controls.

¹³ These images are generated by estimating predictive margins for the key coefficients, with control variables set at mean values (rather than zero, as conveyed in the regression estimates provided in the tables here).

¹¹ Because we generate key regression parameters by gender (meaning gender is not necessary as a conditioning variable), we also chose not to condition based on gender in the full (mixed gender) samples. This therefore provides a slightly more nuanced perspective.

Table 3 Summary statistics of selected variables before and after entropy balancing (base configuration)

	Treatment sample		Control sample unmatched		Matched control sample		Standardised bias	
	Mean	Variance	Mean	Variance	Mean	Variance	Unmatched	Matched
The affected spouse								
Age	44.27	105.4	47.2	118.1	44.27	105.4	-0.028***	0.000
Education attainment (1 = year 12 and below)	0.1238	0.1086	0.1451	0.124	0.1238	0.1086	-0.196**	0.000
Education attainment (1 = tertiary)	0.3865	0.2373	0.3875	0.2374	0.3865	0.2373	-0.004	0.000
Education attainment (1 = trade)	0.3515	0.2281	0.3875	0.2374	0.3515	0.2281	-0.158***	0.000
Migration status (1 = migrant)	0.2647	0.1935	0.2215	0.1724	0.2647	0.1935	0.223***	0.000
Income (natural log)	10.77	3.674	11.17	0.932	10.77	3.674	-0.109***	0.000
Tenure (years)	8.663	69.67	11.84	87.09	8.663	69.67	-0.046***	0.000
Long-term health condition (1 = yes, 0 = no)	0.2105	0.1663	0.3862	0.237	0.2105	0.1663	-1.057***	0.000
Weekly working hours	11.68	120	19.4	239.2	11.68	120	-0.064***	0.000
The entrepreneurial spouse								
Age	44.17	95.995	47.04	117.3	44.17	95.995	-0.030***	0.000
Education attainment (1 = year 12 and below)	0.1193	0.1051	0.148	0.1261	0.1193	0.1051	-0.273***	0.000
Education attainment (1 = tertiary)	0.3272	0.2203	0.3607	0.2306	0.3272	0.2203	-0.152***	0.000
Education attainment (1 = trade)	0.3911	0.2383	0.3349	0.2227	0.3911	0.2383	0.236***	0.000
Income (natural log)	10.82	2.698	10.77	4.484	10.82	2.698	0.019	0.000
Partner's long-term health condition (yes)	0.1956	0.1574	0.3765	0.2347	0.1956	0.1574	-1.149***	0.000
Couple level								
Marital duration (years)	16.07	124.5	19.01	151.9	15.83	124.5	0.122***	0.002
Number of dependent children under 14	0.5934	0.2414	0.6838	0.2162	0.5893	0.2422	-0.374***	0.017
Location (1 = major urban, 0 = otherwise)	0.844	0.1318	0.9041	0.08673	0.8429	0.1325	-0.456***	0.008
Home ownership (1 = yes, 0 = no)	44.27	105.4	47.2	118.1	44.27	105.4	-0.028***	0.000
Total sample size								
Female	2242		133,384		133,384			
Male	1474		66,841		66,841			
	771		66,443		66,443			

Summary statistics for treatment group and matched control couples. The first four columns present means and variances before treatment for treatment and control group. The matched control columns show means and variances for the reweighted control group according to entropy balancing. The standardised bias for the matched samples (final column) is calculated following the Hainmueller (2012) approach. Alternative calculations using weighted *t*-test confirm these values and statistical significance. Samples are also re-matched for males and females separately (results available upon request). Summary statistics for the alternative configuration (1) and (2) are provided in Tables A3 and A4 in the appendix

Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

between the treatment and control groups are completely closed post-treatment. However, these gaps persist for mental health, life satisfaction, and financial satisfaction.

These patterns are generally consistent when stratifying by gender. The average treatment effect on mental health is markedly stronger for females than for males, but the effect on leisure satisfaction is stronger for males.

A negative treatment effect on financial satisfaction is observed for females only, with no effect observed for males. Another interesting pattern is that observed for marital satisfaction, where satisfaction is markedly higher for males than for females (before and after treatment, both in the control and treatment groups).

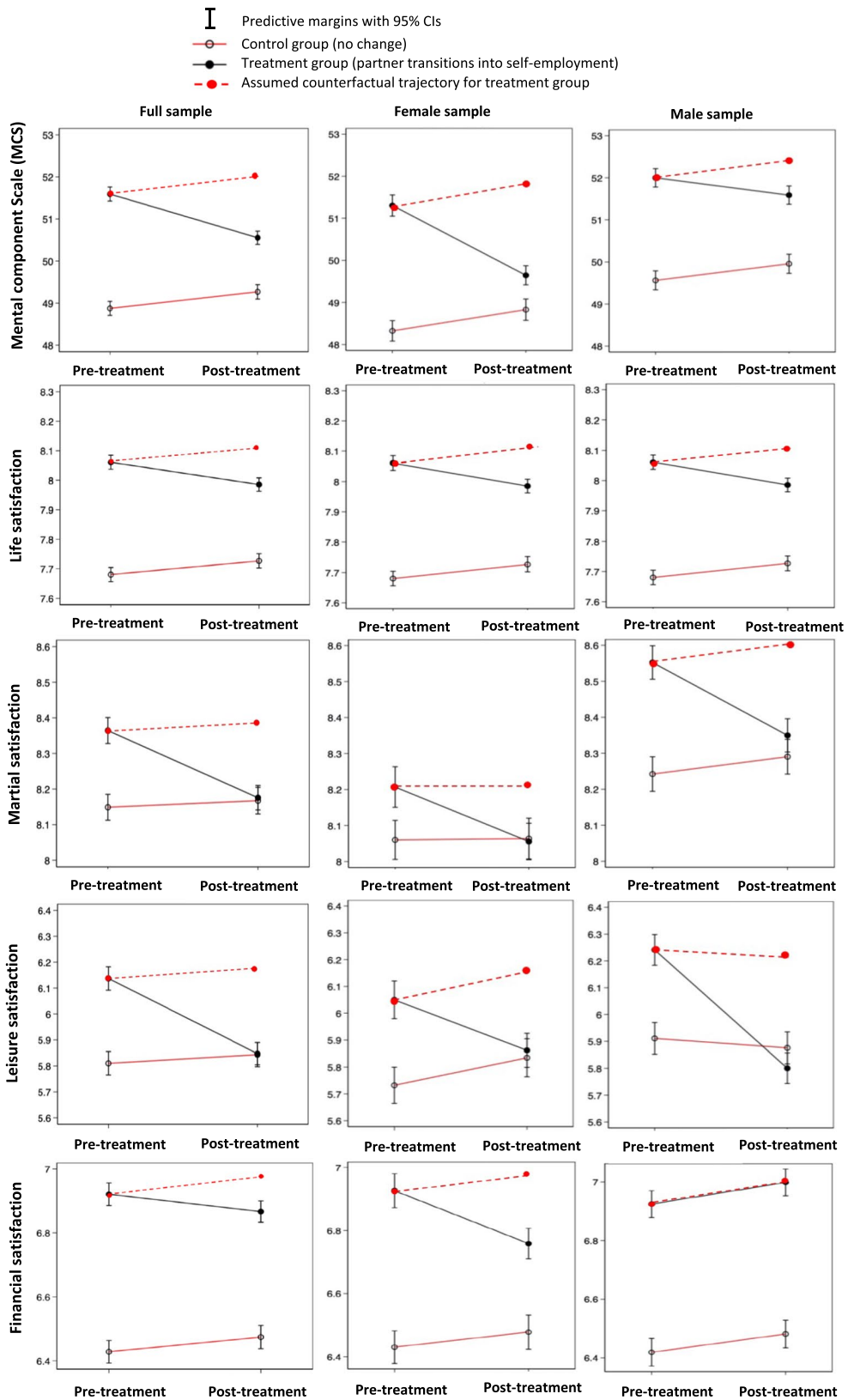
Overall, the base analysis reveals significant well-being gaps pre-transition, with spouses of the

Table 4 Difference-in-differences model estimates for base configuration

	Mental health			Life satisfaction			Marital satisfaction			Leisure satisfaction			Financial satisfaction		
	All	Females	Males	All	Females	Males	All	Females	Males	All	Females	Males	All	Females	Males
	Treatment (β_1)	2.718*** (0.119)	2.978*** (0.177)	2.436*** (0.159)	0.381*** (0.017)	0.396*** (0.025)	0.388*** (0.023)	0.215*** (0.026)	0.147*** (0.040)	0.310*** (0.034)	0.493*** (0.025)	0.496*** (0.038)	0.506*** (0.033)	0.327*** (0.032)	0.318*** (0.049)
Post (β_2)	0.394*** (0.125)	0.503*** (0.183)	0.394** (0.166)	0.047*** (0.018)	0.067*** (0.026)	0.033 (0.024)	0.019 (0.027)	0.004 (0.041)	0.048 (0.035)	0.046* (0.026)	0.048 (0.039)	0.062* (0.035)	0.033 (0.034)	0.102*** (0.051)	-0.035 (0.043)
Treatment* post (β_3)	-1.433*** (0.165)	-2.161*** (0.242)	-0.804*** (0.219)	-0.122*** (0.024)	-0.186*** (0.034)	-0.076** (0.032)	-0.207*** (0.036)	-0.155*** (0.054)	-0.251*** (0.047)	-0.100*** (0.035)	-0.215*** (0.052)	0.011 (0.046)	-0.323*** (0.045)	-0.290*** (0.067)	-0.406*** (0.057)
Constant (β_0)	55.42*** (2.030)	46.41*** (3.017)	64.69*** (2.736)	10.47*** (0.292)	8.76*** (0.429)	12.38*** (0.398)	13.09*** (0.444)	12.96*** (0.674)	12.80*** (0.583)	10.28*** (0.430)	8.86*** (0.644)	11.41*** (0.570)	9.34*** (0.550)	6.76*** (0.840)	12.04*** (0.717)
Observations	43,855	20,596	23,259	43,849	20,594	23,255	43,859	20,598	23,261	43,848	20,594	23,254	43,838	20,589	23,249
Adj. R-squared	0.129	0.148	0.140	0.083	0.109	0.099	0.049	0.064	0.059	0.118	0.140	0.145	0.072	0.097	0.077
Full set of controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

The table presents the MDID estimates where the treatment group consists of individuals who enter self-employment and the control group consists of spouses of individuals who do not, during the sample period. The control variables include gender, age and age square, educational attainment, long-term health condition, migration background, and major life events for both spouses, as well as the number of children in the household under the age of 15, urban/rural location, state dummies, and year dummies (see Table 2 for details)

Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$



◀**Fig. 2** DiD model estimates for base configuration

self-employed reporting higher well-being compared to comparable others. Average treatment effects of transition into self-employment are consistently negative, and these gaps consequently narrow post-transition. However, positive gaps in mental health, life satisfaction, and financial satisfaction persist over the sampling period, while they are neutralised for marital satisfaction and leisure satisfaction.

4.2 Alternative control sample: spouses of individuals changing employers

The first alternative specification compares spouses of individuals who enter self-employment with a matched control sample consisting of spouses of individuals who change employers over the sampling period. Results are reported in Table 5 and visualised in Fig. 3. These alternative results are qualitatively consistent with those of the base configuration, though the pre-treatment gaps between these samples are narrower and confidence intervals are markedly wider due to the reduction in sample sizes. Spouses of those entering employment report higher well-being before transition, compared to spouses of individuals changing jobs. The control group report a weak positive time trend, which again result in negative average treatment effects. In general, this alternative control group behaves similarly to the base control group when compared to the treatment group. This raises the question of how these two control groups compare. A separate comparison (reported in Figure A1 provided in the online appendix) reveals that spouses of individuals who change jobs report lower well-being before transition, compared to the base control group, and an increase in well-being after transition which completely closes the gap. This is consistent with the idea that job change is often motivated by dissatisfaction in the current job and that this dissatisfaction spills over onto the spouse. In that sense, the dynamics we observe among spouses of job switchers is the exact opposite to what we observe among spouses of the self-employed. While the former are positively affected by this transition, the latter are negatively affected.

Overall, this part of the analysis reveals moderate (but not consistently significant) gaps in well-being are observed, with spouses of self-employed reporting higher well-being pre-transition compared to

spouses of job switchers. Post-transition the spouses of self-employed report reduced well-being, while spouse of job switchers report increases. The result is that well-being gaps disappear completely post-transition, or reverses (as seen for mental health and leisure satisfaction).

4.3 Alternative treatment sample: spouses of individuals entering self-employment from unemployment

In the final configuration, we look at the so-called necessity entrepreneurs and evaluate the well-being of spouses of individuals who enter self-employment from unemployment. The results are reported in Table 6 and visualised in Fig. 4. Firstly, we again observe consistent and significant well-being gaps pre-treatment, with the spouses of self-employed reporting higher well-being. However, the dynamics are now a little different. Spouses in this group report an increase in mental health and marital satisfaction after transition, but a decrease in life satisfaction and financial satisfaction (leisure satisfaction is stable). Looking at males and females separately, we see that the improvement in marital satisfaction in the full sample is driven by female spouses (male spouses report steady marital satisfaction) and a marked difference in financial satisfaction, where female spouses report a significant increase and male spouses report a very marked decrease. These dynamics notwithstanding, the key observation from this analysis is that well-being gaps between the treatment and control groups are observed pre-treatment and persist post-treatment.

In summary, we conclude that our results provide strong support for hypotheses H1 and H2, but only weak support for hypothesis H3.

4.4 Robustness checks and remaining limitations

As discussed earlier, the research design followed here is subjected to a number of limitations, which are potentially mitigated by employing a well-considered matching procedure, as well as a model specification which accounts for all conceivable potentially confounding factors. The importance of using a matching procedure is clearly demonstrated when estimating Eq. (1) using unmatched samples. These results (reported in Table A11 to A13 in the appendix) are

Table 5 Difference-in-differences model estimates for alternative configuration (1)

	Mental health			Life satisfaction			Marital satisfaction			Leisure satisfaction			Financial satisfaction		
	All	Females	Males	All	Females	Males	All	Females	Males	All	Females	Males	All	Females	Males
	Treatment (β_1)	0.870*** (0.319)	1.281*** (0.478)	0.324 (0.431)	0.120*** (0.046)	0.120* (0.068)	0.130** (0.064)	0.156** (0.072)	0.055 (0.110)	0.214** (0.096)	0.258*** (0.069)	0.153 (0.105)	0.397*** (0.091)	0.155* (0.088)	0.108 (0.138)
Post (β_2)	0.494 (0.346)	0.863* (0.522)	0.388 (0.452)	0.067 (0.050)	0.091 (0.074)	0.052 (0.067)	0.019 (0.078)	0.040 (0.120)	0.006 (0.101)	0.067 (0.075)	0.081 (0.115)	0.061 (0.096)	0.109 (0.096)	0.221 (0.151)	-0.034 (0.120)
Treatment* post (β_3)	-1.267*** (0.455)	-2.183*** (0.672)	-0.536 (0.606)	-0.102 (0.066)	-0.120 (0.095)	-0.102 (0.090)	-0.151 (0.102)	-0.156 (0.154)	-0.156 (0.136)	-0.047 (0.098)	-0.193 (0.148)	0.109 (0.129)	-0.333*** (0.126)	-0.368* (0.194)	-0.327** (0.161)
Constant (β_0)	50.2*** (2.477)	51.2*** (3.543)	48.8*** (3.660)	9.44*** (0.357)	9.27*** (0.501)	9.94*** (0.544)	10.10*** (0.559)	10.79*** (0.815)	10.18*** (0.819)	7.48*** (0.536)	8.75*** (0.782)	7.53*** (0.776)	7.35*** (0.687)	6.97*** (1.024)	7.92*** (0.976)
Observations	5480	2515	2965	5481	2515	2966	5473	2513	2960	5480	2515	2965	5477	2515	2962
Adj. R-squared	0.126	0.150	0.154	0.076	0.098	0.104	0.057	0.077	0.077	0.138	0.161	0.167	0.075	0.100	0.088
Full set of controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

The table presents the MDiD estimates where the treatment group consists of the spouses of individuals who enter into self-employment and the control group consists of spouses of individuals who change jobs during the sample period. The control variables include gender, age and age square, educational attainment, long-term health condition, migration background, and major life events for both spouses, as well as the number of children in the household under the age of 15, urban/rural location, state dummies, and year dummies (see Table 2 for details)

Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

generally weaker and less consistent than those obtained using matched samples, particularly in the base configuration and the second alternative configuration (this is to be expected, given both these configurations uses the large control sample). Results from the first alternative configuration are much more consistent with those obtained using matched samples (also as expected, given we are comparing two very specific samples). Hence, sample matching plays an important role in this context by revealing patterns in the data which are otherwise obscured, as these patterns are sensitive to the composition of the control sample. Due to the importance of sample matching and appropriate controls, we conduct a number of robustness tests based on alternative matching procedures and model specifications.

The core results are generated based on samples which are matched using entropy balancing, using a range of covariates designed to capture all confounding differences between the treatment and comparison groups. Determining optimal conditioning variables in MDiD designs for causal inference is an ongoing area of study (Chabé-Ferret, 2017; Daw & Hatfield, 2018). Contemporary researchers suggest the control group should be matched to the treatment group based on time invariant characteristics. For example, Chabé-Ferret (2017) demonstrates through simulation that bias in DiD estimates is sizable when matching is performed based on time-varying covariates. Thus, they recommend that matching variables should be either time invariant characteristics or variables that are measured before the treatment and that are not affected by anticipation of “participation”. In order to evaluate whether our results are sensitive to the choice of matching variables, all models are re-estimated using alternative sets of matching variables. Specifically, the samples are re-balanced using only variables that are truly time invariant, omitting those which are not (i.e. excluding income, marital duration, home ownership). The results (available upon request) were not sensitive to whether these variables are included in the balancing of the samples.

The entropy balancing used in the core analysis is carried out using all three moment constraints, such that the mean, variance, and skewness are aligned between the treatment and control groups. Since matching may be sensitive to the metric used to measure similarities between units and to the number of matching constraints requested and to further test the

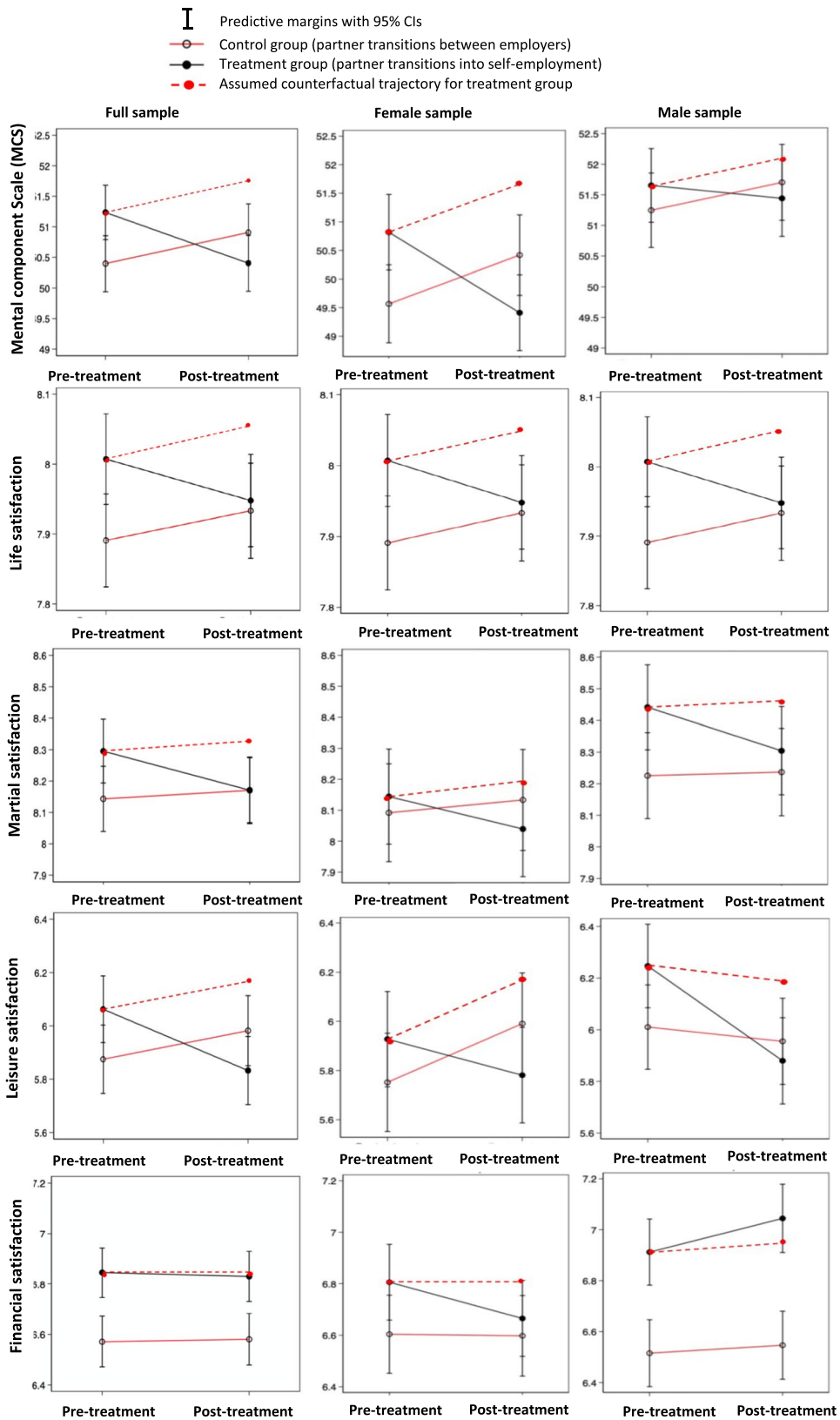
robustness of the matching results, we re-estimated the models by condition on the means only (results available upon request). Finally, we re-estimate the models using the alternative (assumed inferior) propensity score matching procedure (these results are provided in Tables A8-A10 in the appendix). Overall, the results are very robust across these various matching implementations.

The model specifications we used reflect our own judgment of how to best balance the need to avoid bias from omitted information and take into account important effects we want to observe. To evaluate robustness with respect to the choice of control variables, we re-estimated our models using alternative specifications. Specifically, we conducted a robustness check by including personality characteristics¹⁴ and risk aversion,¹⁵ in case our results were associated with reactions and adaptations to change. We found that results (available upon request) were robust in this respect. Finally, we considered the potential for confounding macroeconomic influences, here captured in the form of the changes in the annual unemployment rate, and again our results were robust (results available upon request).

Our research is subject to limitations linked to our available measures of well-being. We rely on self-assessed health measures rather than a diagnosis by a qualified medical professional and are therefore subjected to systematic and random reporting error. For example, individuals may not recognise the difference between having a persistent mental illness and having a temporary stress reaction to an adverse event (i.e. starting the new business). Also, stress may go unreported if the participants are reluctant to acknowledge it to themselves or to others present when providing survey responses. Future research could therefore examine the dynamics of more objective indicators as well as cognitive capacities of both couple partners

¹⁴ The HILDA survey includes measures for the “Big5” personality characteristics of Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism; each measured on a scale between 1 (not at all like me) and 7 (very much like me). These are captured in waves 5, 9, 13, and 17. As they are largely time invariant, the available data point was carried forward to the next wave. For example, we filled out the missing values between wave 5 and wave 9 based on wave 5 data.

¹⁵ Risk aversion is captured by a dummy variable identifying individual who report being prepared to take substantial or above-average risks.



◀**Fig. 3** DiD model estimates for alternative configuration (1)

and how it impacts their health perception. Relatedly, we acknowledge that the 11-point satisfaction scales are assumed to exhibit interval quality—an assumption which, in part, has been substantiated by Kristoffersen (2017). Relaxing this assumption, the base results were estimated as an ordered probit model (results are reported in Table A14 in the appendix). Aside from providing generally consistent results, these estimates also confirm ordered and non-overlapping cuts for score points across for all satisfaction scales (albeit with some fuzzy distinctions at the top of the financial and leisure satisfaction scales), which again support the use of the more efficient least squares-based linear regression estimators.

Finally, we acknowledge that this study is necessarily limited in scope, and the value of the evidence presented here can be enhanced in various ways. Most importantly, this study is limited to the Australian context and focuses on identifying short-term average treatment effects observed over a 2-year period immediately before and after transition. We do not consider long-term dynamics between couples to cover the earlier planning stages, beyond the nascent stage (i.e. after overcoming the liability of newness and smallness and legitimisation of the business). While it would be interesting to consider additional sources of heterogeneity, beyond gender and motivation for self-employment (i.e. necessity versus opportunity), this is considered to fall outside of the scope of the present analysis. Future research could fruitfully consider whether dynamics differ on the basis of other dimensions, such as locality (urban versus rural) or industry. In addition, one may consider how spouses are affected by business success and failure, and how these dynamics operate in the context of exit out of self-employment.

5 Discussion

While many authors have hypothesised potential negative effects of self-employment on spousal well-being (El Shoubaki & Stephan, 2018; Jennings et al., 2013; Wiklund et al., 2018), these propositions have not previously been empirically tested to date. We seek to address this gap in the literature by presenting robust evidence of the effect of self-employment on spousal

well-being. Specifically, we compare spousal well-being before and after entry into self-employment, vis-à-vis a sample of comparable other individuals, which is matched as closely as possible in terms of key demographic and other characteristics. The results highlight the importance of studying comparative dynamics and ensuring appropriate comparison to improve our understanding of the causes and consequences of self-employment at the individual level. Our research design allows us to discern patterns which would be hidden in standard analyses of variation observed both across and within individuals.

Our results show that spouses of individuals who enter self-employment exhibit significantly higher levels of well-being before entry into self-employment, consistent with the idea that such endeavours require substantial spousal support in the form of psychological capital. Hypothesis *HI(a)* is therefore strongly supported by our results. In relative terms, these pre-entry well-being gaps may appear marginal,¹⁶ but are potentially more meaningfully compared with those observed between key demographic groups, the largest of which tend to be found based on marital and employment status. Standard cross-sectional regression of data from the HILDA survey, for example, implies that those who are separated score about 0.8 points lower, and those who are married score about 0.4 points higher, on life satisfaction compared to those who are never married, and those who are unemployed score nearly half a point lower than those who are employed (these differences are highly statistically significant and reflect differences in mean scores after controlling for other demographic, personal, and socio-economic characteristics). The differences in life satisfaction, marital satisfaction, leisure satisfaction, and financial satisfaction observed here between spouses of entrepreneurs and comparable others are of similar magnitudes.

Entry in self-employment, however, takes a toll on spousal well-being, and our results therefore also support hypothesis *HI(b)*. In our base configuration

¹⁶ The gaps in mean well-being scores are 5.6, 5.0, 2.6, 5.6 and 7.7% for mental health, life satisfaction, marital satisfaction leisure satisfaction and financial satisfaction; respectively. However, this disregards the distributional characteristics of these measures. These differences equate to 0.38, 0.36, 0.17, 0.25 and 0.16 of one standard deviation with these samples; respectively.

Table 6 Difference-in-differences model estimates for alternative configuration (2)

	Mental health			Life satisfaction			Marital satisfaction			Leisure satisfaction			Financial satisfaction		
	All	Females	Males	All	Females	Males	All	Females	Males	All	Females	Males	All	Females	Males
	Treatment (β_1)	2.052*** (0.120)	0.925*** (0.181)	2.312*** (0.159)	0.428*** (0.018)	0.509*** (0.025)	0.395*** (0.024)	0.503*** (0.027)	0.061 (0.044)	0.706*** (0.034)	0.735*** (0.026)	0.341*** (0.041)	0.820*** (0.034)	0.438*** (0.032)	0.243*** (0.047)
Post (β_2)	0.089 (0.123)	0.471*** (0.173)	-0.050 (0.165)	0.019 (0.018)	0.070*** (0.024)	-0.005 (0.025)	0.102*** (0.028)	0.165*** (0.043)	0.043 (0.035)	0.001 (0.027)	-0.038 (0.039)	0.021 (0.035)	0.102*** (0.033)	0.094*** (0.045)	0.125*** (0.044)
Treatment* post (β_3)	-0.383** (0.165)	-0.669*** (0.234)	-0.277 (0.224)	-0.065*** (0.024)	-0.055* (0.033)	-0.099*** (0.033)	0.179*** (0.037)	-0.372*** (0.058)	-0.008 (0.048)	-0.301*** (0.036)	-0.102** (0.053)	-0.465*** (0.048)	0.038 (0.044)	-0.213*** (0.061)	-0.022 (0.060)
Constant (β_0)	57.60** (0.890)	69.66*** (1.376)	46.13*** (1.219)	10.17*** (0.130)	9.91*** (0.195)	9.49*** (0.181)	11.41*** (0.201)	12.11*** (0.338)	9.22*** (0.261)	9.31*** (0.195)	11.15*** (0.312)	6.97*** (0.262)	8.66*** (0.235)	11.69*** (0.360)	6.13*** (0.326)
Observations	43,774	20,467	23,307	43,772	20,467	23,305	43,661	20,419	23,242	43,771	20,467	23,304	43,761	20,462	23,299
Adj. R-squared	0.205	0.278	0.243	0.137	0.190	0.184	0.078	0.156	0.123	0.156	0.203	0.218	0.150	0.191	0.200
Full set of controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

The table presents the MDiD estimates where the treatment group consists of the spouses of individuals who enter into self-employment from unemployment and the control group consists of spouses of individuals with no change in employment status. The control variables include gender, age and age square, educational attainment, long term health condition, migration background, and major life events for both spouses, as well as the number of children in the household under the age of 15, urban/rural location, state dummies, and year dummies (see Table 2 for details)

Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

(comparing spouses of individuals who enter into self-employment with comparable others), spouses report significant lower levels in mental and life satisfaction after entry into self-employment. Spouses also report lower marital and leisure satisfaction. This suggests entry into self-employment places significant strains on spouses' well-being and erodes away much of their comparatively greater pre-existing psychological capital. The depletion of resources points to a crossover phenomenon or inter-individual transmission of stress or strain from self-employed to spouses (Westman, 2001).

While several studies have provided evidence that self-employment is associated with greater well-being (Benz & Frey 2008; Nikolova, 2019), there is also evidence that entry into self-employment can be a stressful transition (Kollmann et al., 2019; Reid et al., 2018; Wach et al., 2020). Our results support previously proposed suggestions in the entrepreneurial well-being literature (El Shoubaki & Stephan, 2018; Wiklund et al., 2018) that self-employment demands substantial “psychological capital” from spouses. While positive effects of self-employment may spill over on spouses, our results demonstrate that any such effects tend to be outweighed by negative effects. More broadly, our research also contributes to the wider work-family literature (Boz Semerci & Volery, 2018; Gudmunson et al., 2009; Stevens et al., 2006) indicating the need to move to a dyadic level to consider self-employment and work-family balance as a “couple-level phenomenon”.

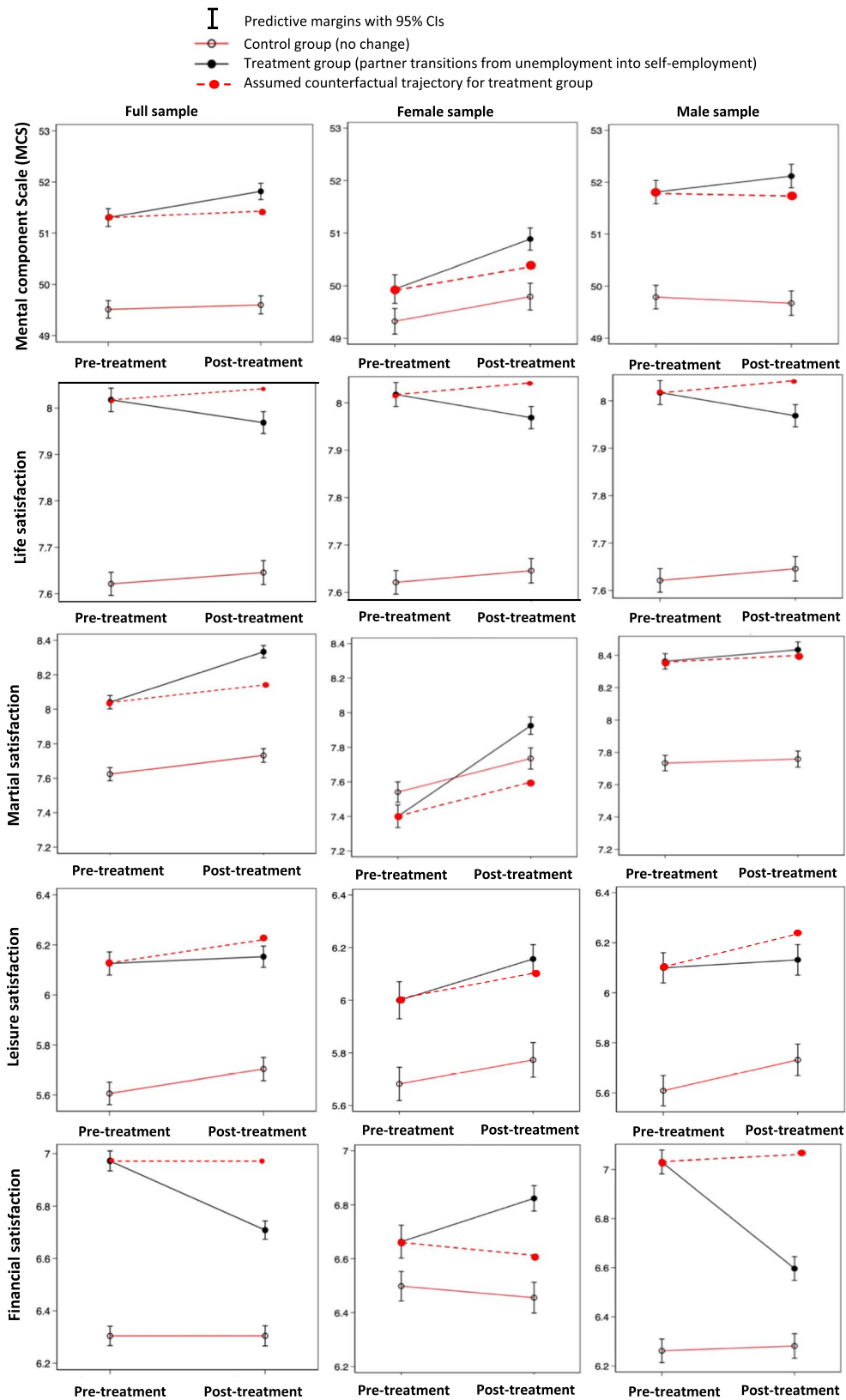
In addition, our study provides a novel and nuanced insight into the well-being of the self-employed by considering gender differences, and differences in motivation to enter self-employment, in the crossover dynamics between self-employment and spousal well-being. We find that the genders are more closely aligned than what one might expect. Both genders start from a higher well-being base compared to the control group, which indicates that (once demographic and other key characteristics are controlled for) spouses of entrepreneurs of both genders exhibit greater psychological capital before entry into self-employment. A decline in spousal well-being in terms of mental health, life satisfaction, and marital and leisure satisfaction is observed for both genders. However, female spouses report a stronger deterioration in mental health, while male spouses report greater decline in marital satisfaction and leisure

satisfaction. Our evidence therefore does not support hypothesis *H3*.

These differences might reflect male spouses experiencing a greater change to the division of household and caring responsibilities during venture creation than do female spouses, simply because female spouses already hold a disproportionate burden in these domains (Danes et al., 2009). Another explanation may relate to differences in coping behaviours. The literature on stress has shown that women tend to use less effective coping methods than men. Often, men describe themselves as more “active” copers, while women are more likely to use “avoidance coping” which is considered maladaptive and could negatively affect well-being (Engel et al., 2019). Further research into the source of these gender differences in this context would provide valuable further insights.

Finally, we consider the specific dynamics observed in individuals entering self-employment from unemployment. The literature generally proposes that well-being benefits are greater for the opportunity-motivated than for the necessity-motivated self-employed (Stephan, 2018), though recent studies (Nikolova, 2019; Amorós et al., 2021) distinguish between different dimensions of entrepreneurial well-being (e.g. mental, physical health) and provide more nuanced results. Our results connect prior findings highlighting the psychological well-being benefits of necessity-motivated self-employed (Nikolova, 2019), and the significant negative crossover effects of unemployment on spouses' mental health (Marcus, 2013). We observe significant crossover effects, as necessity self-employment is associated with improved spousal well-being. Self-employment tends to be associated with net improvements in spousal well-being when providing an alternative to unemployment (i.e. hypothesis *H2*), suggesting positive crossover effects on spouses dominate any negative such effects observed for opportunity-motivated self-employment. Consequently, we find support for the idea that motivation matters.

As for the opportunity-motivated self-employed, we find that the well-being of spouses of necessity-motivated self-employed is higher than the control sample pre-transition. These gaps therefore tend to persist—and then widen—in the following period. This pattern is particularly notable in female spouses, and—interestingly—male spouses report strong negative effects on financial satisfaction. Compared to spouses of opportunity-motivated self-employed,



◀**Fig. 4** DiD model estimates for alternative configuration (2)

spouses of necessity-motivated self-employed tend to report lower well-being before transition (as might be expected), but then higher well-being after transition. Further research might consider the origins of these gaps in the years preceding transition into self-employment, and whether they persist in the years that follow.

In general, our analysis offers important implications for our understanding of the role of spouses in facilitating transition into self-employment, and their capacity to provide continued support. Considering that well-being is a critical resource in self-employment, would-be entrepreneurs who are about to enter self-employment need to recognise associated psychological costs, as well as the benefits. Our results demonstrate that spouses also bear some of these costs, and would-be self-employed should recognise this, and find ways to proactively and openly discuss the challenges that are almost certain to manifest during the transition to self-employment.

Our results are also a reminder for policymakers to take a more holistic approach to self-employment and recognise the important role held by spouses. Social isolation, to which the self-employed are particularly exposed, is known to be a key risk factor for poor mental health. With no superiors and far fewer, if any, colleagues, everyday work may therefore be relatively lonely, lacking important sources of work-related social support. Access to support services may therefore provide valuable assistance to the self-employed and thereby contribute to lessening the burden on spouses (Alshibani & Volery, 2021).

Constraints to the psychological (as well as practical) resources provided by spouses are therefore likely to be a key impediment to venture creation and success and likely to be a significant factor behind the so-called missing entrepreneurs, representing missed opportunities in job creation among underrepresented groups (OECD, European Union 2019). Part of the explanation for these inequalities may be that the self-employed rely much more heavily on spousal support than do the salaried employed, particularly around the time of transition, yet they often do not have the same access to state-funded family support (Pedersini & Coletto, 2010; Annink et al., 2015). Increased family support for employees can in fact contribute to increasing

the barrier to entrepreneurial endeavour and success, because they increase the relative opportunity cost these pursuits. This might play a role in explaining the gender gap in entrepreneurship, which has initiated a push for improved policies to support women in development and success of new ventures (OECD, 2021).

6 Conclusion

The role of spousal support in self-employment has long been acknowledged in the literature, though most often from the perspective of what the spouse can offer the entrepreneur. While many have considered potential reverse effects, considering how entrepreneurship might affect the well-being of the spouse (El Shoubaki & Stephan, 2018; Jennings et al., 2013; Wiklund et al., 2018), these propositions have not previously been empirically tested. The present analysis attempts to fill the gap in the literature, employing a matched difference-in-differences regression to identify effects of entry into self-employment on spousal well-being.

Our results show that spouses of individuals who enter self-employment exhibit significantly higher levels of well-being before entry into self-employment. Well-being tends to diminish after entry for the spouses of opportunity-motivated self-employed, exiting salaried employment, but improve for spouses of necessity-motivated self-employed, exiting unemployment. In both cases, we observe that positive well-being gaps persist in 1–2 years after transition. However, these are short-term dynamics only. Our results raise important questions about the source of the observed well-being gaps before entry and the long-term persistence of these gaps in the years following entry. Specifically, further research is required into whether the pre-entry well-being gaps are a true fixed selection effect or rather the manifestation of significant anticipation effect where well-being increases.

Our research implies that improved awareness by the would-be self-employed, as well access to support services, may both reduce important barriers to self-employment, in the form of spousal psychological capital needed to facilitate support, and the well-being costs borne by the spouse following transition into self-employment. These costs are significant and may be important to explaining the so-called missing

entrepreneurs. More nuanced evidence on the costs of self-employment on spouses and families will improve our understanding of this important part of the labour market. Our findings therefore provide support for the argument that access to family support for entrepreneurs and their spouses is important in reducing key barriers to self-employment, with potentially substantial economic and other benefits to individuals and society.

7 Disclaimer

The views expressed in this paper are those of the authors and should not be attributed to any of the aforementioned organisations.

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