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into self-employment**

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The Role of Job Satisfaction in Transitions into Self-Employment

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Abstract

As observed in many advanced economies experiencing an increase of self-employment rates since the late 1970s, a flourishing small- and medium-size enterprise sector is traditionally associated with positive economic development and growth. In the regional context, areas benefiting from an established entrepreneurial culture are in general more successful and innovative, as well as better equipped to sustain structural changes and to contrast unemployment. It is therefore important to investigate the reasons why individuals choose self-employment, and why they do it despite lower protection, higher risks, and possibly more effort than what is offered in a comparable wage employment position. Existing research identifies better prospects of entrepreneurial earnings as compared to wages as a major attraction towards self-employment. However, beside pecuniary motivations, other factors may be considered when it comes to occupational choice, as, among others, displacement, uncertainty, (the threat of) unemployment, and (dis-)satisfaction. Building on a job quits model, we propose a representation of transition behaviour from wage to self-employment which includes subjective evaluations of pecuniary and nonpecuniary satisfaction on the previous job. Individual microdata are drawn from the Swiss Household Panel (SHP), and cover the time period 1999–2008. Additionally, we focus on the dynamics of job satisfaction in order to highlight the role played by shocks in subjective evaluations, and introduce their interaction with levels to control for threshold effects.

Keywords: self-employment, job satisfaction, job transition, Switzerland

JEL codes: C25, J62, M13

1. Introduction

About 650,000 men and women operate as self-employed agents in Switzerland, including incorporated self-employed (employed by their own company) and family workers (FSO, 2011a). Comprising almost 15 per cent of all active individuals, they run businesses in the retail, trade, manufacturing, financial and insurance sectors, as well as in the accommodation and food services (FSO, 2011a and 2000). With a slight delay with respect to other OECD countries, Switzerland has experienced a rise of the self-employment rates since the early 1980s (Flückiger and Ferro Luzzi, 2001; Falter, 2001). Among the factors that may have encouraged the increase in the number of self-employed workers, it is worth mentioning the development of the ICT sector, the improvement in production processes and the increase in outsourcing activities, as well as fiscal and personal reasons (Birchmeier, 2000). In the meanwhile, wage employment could have been affected by rigidities in wages and the extension of mandatory health insurance to elderly people (Falter *et al.*, 1998). Earnings differentials between self-employed and dependent workers still play in favour of the latter, who earn about 10 per cent more per year (FSO, 2011a).¹ However, the share of individuals in the highest-earning class (more than CHF104,000 per year) is considerably larger among the self-employed than among the employees (23 and 18 per cent, respectively, of those reporting positive earnings; FSO, 2011b). Further evidence shows that differences in earnings between self- and wage employment becomes less important for men (6.7 per cent), and indistinguishable for resident immigrants (approximately 0 per cent).

Several studies have shed light on the role played by small-business owners in economic growth (e.g., Lucas, 1978; Kihlstrom and Laffont, 1979; Blau, 1985; Brock and Evans, 1986; Rees and Shah, 1986; Evans and Leighton, 1989b), and on their ability to create new jobs (Birch, 1979). Existing studies on transitions from wage- to self-employment identify start-ups as an important source of business dynamics and innovation (Jovanovic, 1982; Dunne *et al.*, 1987; Evans, 1987a, b; Pakes and Ericson, 1987). Moreover, differences in the earnings distributions of self-employed workers and dependent employees have been analysed, giving rise to a number of theories seeking to explain such differences (Lazear and Moore, 1984; Jovanovic, 1982; Rosen, 1981).

At the same time, many policy interventions aiming to encourage self-employment have been implemented by national and regional governments around the world in order to stimulate new employment opportunities and reduce unemployment (Blanchflower, 2000). Most governments offer assistance to small businesses, providing subsidies for individual start-ups, and Swiss national and regional policies are no exception. Universities often contribute as well, establishing start-up centres and incubators, with the dual aim of supporting newly-formed businesses and conducting related research. From a regional development perspective, filling up the gap between wage and self-employment earnings may contribute to the convergence of less dynamic and peripheral areas towards more successful and innovative regions (Reynolds, 1994 and 1999; Acs and Armington, 2004).

Existing research on self-employment transitions makes a wide use of rational agent-based models assuming that individuals choose self-employment if the expected utility of this option exceeds the one associated with wage employment. Better prospects of entrepreneurial earnings as compared to wages are, according to the greater part of this literature, a major attraction towards self-employment (Rees and Shah, 1986; Fujii and Hawley, 1991; Taylor, 1996).

However, beside pecuniary motivations, other factors enter into consideration when it comes to occupational choice. Recently, the assumption that earnings act as a proxy for utility has been relaxed. Hamilton (2000) shows that the nonpecuniary benefits of self-employment are substantial, with most entrepreneurs entering – and staying – in business despite lower initial earnings and lower earnings growth with respect to wage

¹ Computations are made on full-time yearly gross revenues evaluated at the median for resident dependent workers (CHF80,400) against self-employed and family workers (CHF72,900), for the year 2009.

employment. Evans and Leighton (1989a) and Taylor (1996) find that, beside higher expected earnings, the independence offered by self-employment positively influences individual decisions towards business ownership.

A nonpecuniary aspect which is often advocated as a major driving force in entrepreneurship is the one associated with (dis-)satisfaction. Brockhaus (1982) finds self-employed workers to be relatively strongly dissatisfied with their previous (dependent) work, with supervision and with opportunities for promotion. More generally, emotional factors such as feeling inappropriate/displaced, and uncertainty often precede the formation of a company (Shapiro and Sokol, 1982). Moreover, (the threat of) unemployment, as well as being bored or angered, has been shown to positively affect self-employment choices (Hofstede *et al.*, 2004; Wennekers *et al.*, 2001). Thus, individuals dissatisfied with their job are expected to be more inclined to enter into self-employment. As a result, the self-employed generally report higher satisfaction with their job than employees (Blanchflower and Freeman, 1997; Blanchflower and Oswald, 1998; Blanchflower, 2000; Taylor, 2004). However, on the subjective characteristics of wage employment that are expected to lead to entrepreneurship, as well as on the dynamics of job satisfaction, the literature is limited.

Since people may self-select into entrepreneurship (given the inability to find a satisfying job in the case of low-skilled workers, or the inexistence of comparatively remunerated alternatives in wage employment in the case, for example, of physicians or lawyers), it is important to look also at objective work conditions, so that job satisfaction can be seen as an “excess” reward discounting future potential flows of utility deriving from a change in working conditions with respect to the current situation. Moreover, given the (relatively) high persistence of job satisfaction levels and the reduced propensity to react to them with longer tenure (and greater age), our suggestion is to look not only at levels of job satisfaction, but also at variations. Dissatisfied workers may react differently if they experienced recent improvements in job satisfaction. In the meantime, more satisfied workers may behave differently if they came across a negative variation in their satisfaction levels.

Building on a job quits model (Akerlof *et al.*, 1988; McEvoy and Cascio, 1985; Freeman, 1978), we propose a representation of transition behaviour from wage to self-employment which includes subjective evaluations of (previous) job satisfaction. Individual microdata are drawn from the Swiss Household Panel (SHP), and cover the time period 1999–2008. We use two measures of job satisfaction: satisfaction with income and satisfaction with working conditions and we regard them as direct measures of individuals utility (Clark and Oswald, 1996; Taylor, 2004). Rather than including current levels of satisfaction or assessments regarding past work characteristics, we rely on subjective levels of satisfaction that were reported before the choice was made, so as to measure real/actual perceptions about past working conditions.

Additionally, we focus on the dynamics of job satisfaction in order to highlight the role played by shocks in subjective evaluations and introduce their interaction with levels to control for threshold effects. Unlike most of the studies cited above, we are able to discriminate between the evaluations regarding pecuniary and nonpecuniary benefits, and to address the question of whether the inclusion of subjective variables and their variations in time matter in modelling self-employment transitions and job quits.

The remainder of the paper is structured as follows. In Section 2 we discuss our empirical approach. In Section 3 we briefly describe the data. In Section 4 we present estimates for our model of job transitions including levels and variations of job satisfaction, controls for demography, human and financial capital, as well as job characteristics. We also test a specification that incorporates the interaction between levels and variations of job satisfaction in order to investigate the presence of threshold effects. In Section 5 we summarize and discuss our findings.

2. The Model

Despite the widespread use of job satisfaction measures in social sciences, economists have often been reluctant to incorporate such variables in their models, partly because of their subjective nature, and partly because satisfaction is supposed to provide a proxy for individual utility, and thus it requires caution (Freeman, 1978, p.135).

A promising representation of the choice problem faced by individuals addressing the question of whether or not leaving a paid position for venturing into self-employment is the one provided by the job quits literature (Clark *et al.*, 1998; Akerlof *et al.*, 1988; McEvoy and Cascio, 1985; Freeman, 1978; Flanagan *et al.*, 1974). Within this framework, we assume that individuals consider the opportunity of voluntarily leaving their job as a function of expectations regarding pecuniary and nonpecuniary benefits outside of the current employer with respect to those offered inside, in addition to mobility costs (Lévy-Garboua *et al.*, 2007). Job quits are observed among individuals reporting a difference between the sum of pecuniary and nonpecuniary benefits in current and future positions, where job satisfaction is a monotonic, discrete function of these sums (Akerlof *et al.*, 1988). Dissatisfied workers have higher quit rates than satisfied workers because the former perceive the expected present value of their job as being lower with respect to the one offered by outside opportunities. Alternatively, mobile workers experience greater increases in satisfaction if they were willing to leave than if they were not (Bartel and Borjas, 1981; Gottschalk and Maloney, 1985; Clark, 2001). As a result, quitters report higher satisfaction levels in their new job than in their old one (Akerlof *et al.*, 1988).

Similarly, we argue that transitions into self-employment are taken into consideration if the expected pecuniary and nonpecuniary benefits of entrepreneurship are greater than those in paid work. However, since individuals do not have complete and adequate information on these potential benefits *before* entering self-employment, they estimate them on the basis on their experience, their level of education and existing opportunities. Job satisfaction can be seen as a reasonable indicator summing up perceptions about the comparative advantage of remaining in the current job against the alternatives.

However, given the existence of self-selection problems in models explaining entrepreneurial choices – optimistic people may choose to enter self-employment or simply to address differently the costs that the more heterodox option of turning to self-employment implies (in terms of mobility, and risks) – we include controls for objective job characteristics, so as to regard job satisfaction as the “excess” rewards in current paid job with respect to average rewards potentially available to the worker in self-employment.

Additionally, we include the effects of changes in job satisfaction. Variations in this variable might hide serious concerns about the current and future job position in comparison to past experience. Moreover, since it is likely that workers, while assessing their satisfaction, also include general assessments regarding the alternatives, changes in job satisfaction may reveal the opening of new opportunities against which the comparison is made, or improvements in existing alternatives.

In order to facilitate comparison with the existing literature on job quits, and to check whether job satisfaction differently affects quits and self-employment transitions (as we should expect, since the former decision might be more conservative and less risky), we consider also those who quit their job but remain in paid employment.

For a cross-section of individuals reporting a working status as employee at time $t - 1$ and $t - 2$, we estimate the effects of (dis-)satisfaction and other determinants on transition probabilities by means of a multinomial logit model (McFadden, 1974; Greene, 2008) taking the form:

$$\Pr(y_t = i) = \frac{e^{X_{t-1,t-2}\beta^{(i)}}}{\sum_i e^{X_{t-1,t-2}\beta^{(i)}}} \quad (1)$$

where $i = 1, 2, \dots, I$ are the possible outcomes of the transition function y , evaluated at time t , and X are the explanatory variables evaluated at time $t - 1$ and $t - 2$. In our model, we assume that there are $I = 3$ outcomes: “staying in current (paid) job”, “changing job/employer”, and “changing status from wage- to self-employment”. We thus estimate two sets of coefficients, $\beta^{(2)}$ and $\beta^{(3)}$ corresponding to each outcome, where $\beta^{(1)}$ is set to zero for identification purposes. $\Pr(y = i)$ is the probability that the worker will choose the outcome i at time t . Probabilities of transition are linked to the individual and job characteristics, including job satisfaction levels evaluated at time $t - 2$ and recent variations in job satisfaction.² The matrix of covariates includes standard socioeconomic variables evaluated at time $t - 1$, such as age, gender, nationality, marital status, and the level of education. Additionally, we control for union membership and homeownership. Objective work aspects are included as well, and they account for the level of earnings, the number of working hours, assessments regarding job insecurity and unemployment risk. Time fixed effects – controlling for the influence of the business cycle on transition decisions – are also incorporated in the model.

Job satisfaction is evaluated on a 0–10 scale, where 0 corresponds to the answer “not at all satisfied” and 10 is “completely satisfied”. Dynamic effects of satisfaction on transition probabilities are estimated through the inclusion of the percentage change between the individual’s satisfaction level at time $t - 1$ and the level of satisfaction expressed in the year before, divided by the latter:

$$\frac{\Delta x_{t-1}}{x_{t-2}} = \frac{x_{t-1} - x_{t-2}}{x_{t-2}}. \quad (2)$$

Since we may expect the dynamic effects of satisfaction to differently influence transition probabilities depending on the previous level of satisfaction, we include the interaction term between the percentage change and the level of satisfaction. By doing so, we are able to assess whether, say, individuals starting from low levels of satisfaction experiencing a decline of the same are influenced differently in their decisions than individuals facing the same percentage change, but starting from higher levels of satisfaction. In this respect, our paper intends to fill a gap in turnover research, by including an assessment on the formation of individual perceptions about job satisfaction.

The log of the wage is used as a measure of pecuniary rewards, while in order to control for nonpecuniary aspects, we include variables measuring the number of weekly worked hours, the feeling of job insecurity (ranged 1–5), and the risk of falling into unemployment (on a 0–10 scale). A set of additional variables is used to control for differences in human and financial capital: the level of education (distinguishing between individuals with a vocational or a university degree against the reference of people with basic education), union membership, and homeownership. Previous studies have shown that both self-employment probabilities and earnings are strongly influenced by liquidity constraints (Evans and Jovanovic, 1989; Holtz-Eakin et al., 1994; Lindh and Ohlsson, 1996; Black *et al.*, 1996; Blanchflower and Oswald, 1998). Moreover, financial capital, and in particular real estate, is an important source of collateral for entrepreneurs, that is expected to reduce the default premia (Henley, 2005).³

Furthermore, we control for age (which is expected to capture both work experience and wealth accumulation possibilities), nationality, marital status, and gender. Some of these characteristics are expected to capture differences in individual perceptions of, and attitudes to, risk (risk aversion), since people may be differently aware of the risk of failure in the entrepreneurial case or of unemployment in paid work.

² We select satisfaction levels at time $t - 2$ in order to interpret them, in our model specification, as initial levels, while variations in job satisfaction measure changes from satisfaction levels evaluated at time $t - 2$ to levels in $t - 1$.

³ It would be worth to address parental background as well, and more specifically the example (familiar role models) provided by parents, which has been shown to represent a powerful predictor of the propensity towards business ownership. Although our data set would do allow to control for parental occupation, unfortunately the number of cases being recorded is too small to provide significant insights.

3. Data

The empirical analysis in this paper makes use of waves 1-10 of the SHP, for the time period 1999-2008. We select men and women above age 18 in the first wave and under age 65 years in the last wave, obtaining a sample of over 38,000 observations regarding economically active and inactive individuals who are tracked during the ten years of the survey.

Transitions between the four employment categories across all panels are summarized in Table 1. As it can be seen from Table 1, the majority of those in wage employment stay in that category from one year to another (more than 92 per cent). Only a small proportion of employees at any time turn to self-employment in the following year (1.9 per cent). Nearly 4 per cent quit wage employment and exit the labour force, and very few become unemployed (1.2 per cent). Among those who are self-employed at $t - 1$, more than 78 per cent remain self-employed in the following year, whereas a considerable minority transits into wage employment (15.7 per cent) or exit the labour force (5.1 per cent). In general, self-employment is less stable than wage employment, although transition rates into unemployment and inactivity do not differ much for these two categories. Finally, among those who are unemployed in year $t - 1$, the most frequent occurrence is to become either employed or inactive (54.9 and 19.7 per cent respectively) or to remain in unemployment (22.8 per cent). Very few individuals enter self-employment (2.6 per cent). Among those recorded as inactive, the majority remains inactive in the following year (76.4 per cent) or enters wage employment (18.1 per cent). Transitions into self-employment or unemployment are rare.

Table 1: Transitions between employment categories

Year $t - 1$	Year t				Total cases
	Employed	Self-employed	Unemployed	Inactive	
Employed	25,419 (92.6)	511 (1.9)	316 (1.2)	1,207 (4.4)	27,453 (100.0)
Self-employed	524 (15.7)	2,626 (78.6)	19 (0.6)	171 (5.1)	3,340 (100.0)
Unemployed	387 (54.9)	18 (2.6)	161 (22.8)	139 (19.7)	705 (100.0)
Inactive	1,208 (18.1)	192 (2.9)	173 (2.6)	5,105 (76.4)	6,678 (100.0)
Total cases	27,538 (72.1)	3,347 (8.8)	669 (1.8)	6,622 (17.3)	38,176 (100.0)

Note: Transition probabilities between brackets.

In order to analyse transitions from wage- to self-employment, the data have been restricted to only cases in which individuals were employed at time $t - 1$ and $t - 2$ and either (1) stayed in wage employment without changing their job/employer, (2) quit their job/employer without changing status or (3) became self-employed at time t . The information is drawn from the pooled sample of observations from 2001 (Wave 3) to 2008 (Wave 10), which has been further restricted in order to select cases where information on all the listed covariates was available. This confines our analysis to a sample of 4,713 individuals among which 1,266 quit their job/employer (26.9 per cent) and 443 (9.4 per cent) were found to enter self-employment at some time.⁴

In order to investigate the drivers leading to transition we consider the variables listed in Table 2. They account for the level of satisfaction regarding pecuniary and nonpecuniary job aspects, human and financial endowments, as well as for other demographic and job characteristics. Table 2 provides descriptive statistics for each variable for the sample of stayers, for the one of quitters (leaving their job without changing their status) and for that of emergent entrepreneurs (leaving their job for a self-employment career).

⁴ Clearly, this data set restriction is carried out under the assumption that transitions into self-employment are still traceable after one year, that is, that the number of transitions failing before being recorded in the subsequent SHP wave is negligible.

Table 2 - Descriptive Statistics, by Groups (Stayers vs Quitters vs Emergent entrepreneurs)

	Stayers		Quitters		Emergent entrepreneurs	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Satisfaction						
Satisfaction: income ($t - 2$)	7.313	1.990	6.863	2.181	6.966	2.231
% change in satisfaction: income	0.025	0.384	0.053	0.615	0.048	0.490
Satisfaction: job conditions ($t - 2$)	7.933	1.679	7.516	1.839	8.240	1.638
% change in satisfaction: job conditions	0.015	0.257	-0.002	0.337	0.042	0.371
Demographics						
Age	43.762	11.176	36.245	11.013	45.489	10.198
Female	0.494	0.500	0.475	0.500	0.549	0.498
Ethnic minority	0.111	0.314	0.112	0.315	0.081	0.273
Married: no	0.357	0.479	0.538	0.499	0.248	0.432
Human and financial capital						
Education 2	0.138	0.345	0.164	0.371	0.200	0.400
Education 3	0.135	0.342	0.166	0.372	0.208	0.406
Union membership: yes	0.237	0.426	0.185	0.389	0.156	0.364
Homeownership	0.514	0.500	0.441	0.497	0.644	0.479
Objective work characteristics						
Income/10,000	62.385	43.179	56.057	58.353	72.243	99.962
Working hours	31.269	12.011	32.815	11.366	32.571	15.321
Job (in-)security	1.720	0.721	1.982	0.965	1.809	0.848
Risk of unemployment	1.624	2.224	2.835	3.017	1.679	2.599
Cases	3,004		1,266		443	

The level of satisfaction with income in the sample of quitters and in the one of emergent entrepreneurs is on average lower than the one of the stayers (6.9, 7.0 and 7.3, respectively), suggesting that dissatisfaction linked to pecuniary aspects may act as a push factor. On the other hand, percentage changes in income satisfaction are higher among the former two groups than the control group of stayers (5.3 and 4.8, versus 2.5 per cent), implying that, on average, quitters and emergent entrepreneurs experience more favourable evolutions in job satisfaction. However, heterogeneity in all samples is rather high.

The level of satisfaction with working conditions is on average higher among the emergent entrepreneurs than in the reference group of stayers (8.2 and 8.0, respectively), while the quitters are the least satisfied (7.5). This suggests that the former benefit from more advantageous job conditions or that they just assess them in a more optimistic way than the ones deciding to stay in wage employment (either changing their job/employer or not). Variations in job satisfaction regarding nonpecuniary aspects are also higher among the group of those that turn to self-employment than among individuals deciding to stay in wage employment, either changing their job or not (4.2, -0.0 and 1.5 per cent respectively), suggesting that nonpecuniary job evaluations may be correlated with intrinsic/individual characteristics/attitudes rather than solely with objective job aspects.

In general, there is, in all samples, less heterogeneity for assessments regarding the level of satisfaction with working conditions than with income, suggesting that the distribution of (dis-)satisfaction is more equal for nonpecuniary aspects than for pecuniary job characteristics. Moreover, in all samples the percentage change in income satisfaction is on average higher than the percentage change in nonpecuniary satisfaction, which may indicate that improvements in the perceptions regarding pecuniary job aspects are more likely to occur (consistent with the underlying distribution of income, that is expected to be more linear in time), even if the high heterogeneity observed suggests that there are many winners and losers. Finally, our data suggest that static and dynamic reactions to pecuniary job rewards impact differently on transition behaviours.

The average age in the emergent entrepreneurs sample is 45.5, which is significantly higher than the average age of 43.8 in the stayers sample.⁵ Quitters are on average younger (36.2). Emergent entrepreneurs are more

⁵ We test differences by means of a t-test on the null hypothesis that the means in each group (job stayers vs job quitters) are the same. Statistics are not reported, but can be obtained upon request.

likely to be female with respect to the stayers and the quitters (54.9 per cent in the sample, compared to 49.4 and 47.5 per cent respectively). At a first glance, this suggests that women in Switzerland are more entrepreneurial or that they self-select in sectors characterised by more favourable business opportunities (e.g., personal services, education, health- and childcare). The emergent entrepreneurs sample has a significantly lower proportion of foreigners than the stayers and the quitters samples, which reflects a peculiarity of the Swiss labour market where immigrants are less likely than natives to become entrepreneurs (Guerra *et al.*, 2010). The percentage of non-married individuals (single, divorced or widow) is considerably higher among the quitters (53.8 per cent) than among the stayers and the emergent entrepreneurs (35.7 and 24.8 per cent).

With regard to the proxies for human and financial endowments, self-employment candidates seem to be more likely to have attained a vocational (20.0 per cent) or university degree (20.8 per cent) than those staying in wage employment (16.4 and 16.6 per cent among the quitters; 13.8 and 13.5 per cent among the stayers). There are significant differences among the proportion of those who are member of a union in the three groups (23.7 per cent among the stayers, 18.5 among the quitters and only 15.6 among the emergent entrepreneurs). Homeownership rates are higher among the emergent entrepreneurs than the stayers and the quitters (64.4 per cent, against 51.4 and 44.1 per cent, respectively). This preliminary evidence suggests that probabilities of transition towards self-employment are positively associated with the level and quality of both human and financial capital, and negatively correlated with union membership, this latter result possibly being related to the different work functions of workers belonging to the two groups.

Emergent entrepreneurs make slightly more (CHF9,860 more per year, +15.8 per cent) than the average income registered for the stayers, while quitters report on average significantly lower earnings (CHF6,330 less per year, -10.1 per cent). Differences among the three averages are significant at the 1 per cent level. However, heterogeneity in the emergent entrepreneurs sample is high, which suggests that turning to self-employment is not always profitable *per se*.⁶ There are little, although significant, differences between the amount of working hours reported in the three samples, with an increasing number of hours that are dedicated by the quitters and the emergent entrepreneurs to their working activity. There are differences between those deciding to stay in their current job, the quitters and those turning to self-employment with regard to the level of job insecurity, with an average level of 1.7, 2.0 and 1.8 respectively. Finally, there is little exposure to unemployment risk in both the stayers and the emergent entrepreneurs samples (1.6, 1.7 respectively), while the quitters are significantly more exposed (2.8).

We abstain from considering the industrial and professional composition of our samples, since the inclusion of these characteristics was found to capture objective work conditions, without increasing goodness of fit. Furthermore, the high number of missing values for these variables would considerably reduce our sample size. Similarly, the inclusion of regional dummies was found not to affect our results.

⁶ In fact, median income among the stayers (CHF58,310) is significantly higher than for the quitters (CHF50,200) and the emergent entrepreneurs (CHF49,250), which is consistent with FSO data (FSO, 2011a).

4. Empirical Results

Equation (1) is estimated by maximum likelihood using the covariates discussed in Section 3. Table 3 reports a first set of estimates: column (2) shows parameter estimates for the quitters against the reference category of the stayers; column (3) reports estimation results for those who changed their status in self-employed (and are thus referred to as emergent entrepreneurs).

The inclusion of satisfaction variables improves the goodness of fit (with respect to a base model including only objective job and personal characteristics, not shown), without affecting sign and significance of other parameter estimates (McFadden's pseudo- R^2 of 0.167 against 0.156 in the base model; AIC 6,238.03 against 6,405.62; BIC 6,543.63 against 6,660.90 in the base model. A χ^2 -based likelihood ratio test confirms that the inclusion of subjective variables leads to a highly significant model improvement.

Table 3 – Maximum Likelihood Multinomial Logit Estimates on Transition Probabilities

	(2) Quitters		(3) Emergent entrepr.	
	Parameter	Standard errors	Parameter	Standard errors
Satisfaction				
Satisfaction: income	-0.024	0.026	-0.219	0.039***
% change in satisfaction: income	0.201	0.099**	-0.309	0.168*
Satisfaction: job conditions	-0.142	0.03***	0.216	0.05***
% change in satisfaction: job conditions	-0.516	0.161***	0.549	0.246**
Demographics				
Age	-2.197	0.156***	0.355	0.252
Female	-0.156	0.091*	0.41	0.154***
Ethnic minority	-0.113	0.127	-0.092	0.208
Married: no	0.156	0.09*	-0.437	0.148***
Human and financial capital				
Education 2	0.519	0.11***	0.645	0.16***
Education 3	0.543	0.112***	0.983	0.164***
Union membership: yes	-0.19	0.095**	-0.569	0.155***
Homeownership	0.002	0.083	0.231	0.13*
Year (Reference: 2001)				
2002	0.338	0.139**	0.677	0.23***
2003	0.404	0.15***	0.66	0.248***
2004	0.283	0.182	-0.709	0.459
2005	0.887	0.172***	-0.26	0.428
2006	-0.027	0.14	2.04	0.19***
2007	0.349	0.137**	-0.49	0.308
2008	0.215	0.133	-0.709	0.314**
Objective work characteristics				
Income	-0.008	0.067	-0.389	0.089***
Working hours	0.012	0.004***	0.014	0.006**
Job (in-)security	0.199	0.055***	0.126	0.089
Risk of unemployment	0.133	0.017***	-0.031	0.029
(Intercept)	7.073	0.753***	-0.978	1.203
Observations		4,301		
LR chi2 (dof)		1,230.51 (46)		
Mac Fadden Pseudo R2		0.1669		
AIC		6,238.03		
BIC		6,543.63		
Log Likelihood		-3,071.02		

Notes: * Denotes parameter significant at 10%, ** at 5%, *** at 1%.

According to our results, satisfaction significantly affects transition probabilities, although the effects are different for job quitters and for emergent entrepreneurs. On the one hand, the level of satisfaction regarding pecuniary job rewards (i.e., income) negatively affects probabilities of both entering self-employment and quitting the job, whereas this latter effect is rather small and not statistically significant. Thus, persistent income dissatisfaction provides a push factor for entrepreneurial choices, while it does not affect job quits. With regard to variations in income satisfaction (our measure of changes in long-run satisfaction levels),

recent improvements discourage decisions leading to self-employment, while they are positively associated with job quits.

On the other hand, the level of satisfaction about nonpecuniary job aspects (i.e., work conditions) negatively influences job quits, but positively affects probabilities of moving towards self-employment. These results are reinforced by the negative (positive) effects found for variations in satisfaction regarding nonpecuniary aspects.

We argue that individual perceptions regarding pecuniary and nonpecuniary job rewards do matter when deciding to take the risk of quitting an existing job for a new (eventually self-employment) career. According to our results, job quitters change not for money but to improve their work conditions (either to get away from annoying colleagues/boss or to get a more satisfying job), whereas emergent entrepreneurs are generally more satisfied with their work conditions (probably, because they have different – i.e., higher – job functions) but change mostly for money.

The opposite signs found here for the effects of our two measures of job satisfaction on transition probabilities towards self-employment may reflect differences in the workers' reactions between subjective evaluations of pecuniary and nonpecuniary aspects. Differences in reactions may arise because of the different nature and distribution of the underlying work characteristics (income and job conditions, respectively). Moreover, one might argue that it is easier, for the worker, to assess satisfaction with current earnings (by comparing them with what was earned in the past, with earnings in comparable positions and with expectations regarding future earnings, thanks to an underlying variable – i.e., income – that is generally increasing over time) than with work conditions (which are more subject to favourable and unfavourable changes and less easily comparable with what is offered by the alternatives). Finally, problems of self-selection may arise, where more optimistic workers may choose to become self-employed.

Probabilities of quitting are negatively influenced by the age of the respondent, as well as by gender (i.e., males are more likely to quit), whereas the opposite hold for probabilities to enter self-employment, although the effect of age is not significant in this case. Nationality does not seem to affect transition probabilities (most probably because of the very few cases of foreigners recorded in our samples), whereas being single or divorced decreases the probability of entering self-employment – probably because of the inability of singles to draw on partners' pecuniary and nonpecuniary contributions (which may be crucial especially in the early times of self-employment) – but is positively related to job quits.

Transition probabilities are positively affected by the level of education, implying that higher levels of human capital – as expected – increase knowledge regarding the alternatives, whereas unionized workers are more reluctant to change their job/status. Homeownership is seen as a factor positively influencing self-employment transitions, since it reflects wealth accumulation and because of the fact that housing wealth is usually seen as a source of collateral for business ownership, while it does not seem to affect job quits.

As for the effects of the objective work characteristics, we find a negative effect for the level of (log)income on self-employment probabilities, which implies that higher wages provide a disincentive for transitions into self-employment, while there are no apparent effects of pecuniary rewards on job quits. The number of hours worked is positively and significantly associated to transition probabilities, both for emergent entrepreneurs and for job quitters, suggesting that there is a certain degree of self-selection of the most active/assiduous workers for more challenging outcomes.⁷ As for the effects of the other measures of objective work

⁷ This hypothesis is somehow related to the surprising results found by Taylor (2004) for job satisfaction levels of the self-employed, which report higher levels of job satisfaction with hours of work than employees, despite the well-documented fact that the former work in general much harder than the latter (Blanchflower, 2004).

conditions, both the level of self-reported job insecurity and the risk of unemployment do not seem to significantly influence transitions to self-employment, but they positively affect job quits.

Finally, time dummies are significant, and most likely reflect business cycle dynamics.

In order to investigate whether individuals with below-average job satisfaction levels are more likely to change their job or to move towards self-employment if they experienced recent declines in job satisfaction, as we would expect, we include interaction terms between levels and percentage changes in both satisfaction measures. Table 4 reports our estimates for this specification. The inclusion of interactions slightly improves the goodness of fit (McFadden's R^2 of 0.17; AIC 6,223.63 and BIC 6,554.69). Likelihood ratio tests confirm that this specification (with interaction terms) is significantly better than the base model and the one without interactions.

Table 4 – Maximum Likelihood Multinomial Logit Estimates on Transition Probabilities: Model Including Interactions

	(2) Quitters		(3) Emergent entrepr.	
	Parameter	Standard errors	Parameter	Standard errors
Satisfaction				
Satisfaction: income	-0.016	0.027	-0.23	0.04***
Satisfaction: income (difference)	0.24	0.144*	-0.075	0.219
Satisfaction: income (difference*level)	-0.002	0.037	-0.081	0.057
Satisfaction: job conditions	-0.152	0.03***	0.221	0.051***
Satisfaction: conditions (difference)	0.869	0.349**	0.782	0.502
Satisfaction: conditions (difference*level)	-0.259	0.059***	-0.021	0.087
Demographics				
Age	-2.182	0.156***	0.359	0.252
Female	-0.157	0.092*	0.414	0.154***
Ethnic minority	-0.149	0.128	-0.103	0.208
Married: no	0.16	0.09*	-0.45	0.149***
Human and financial capital				
Education 2	0.522	0.11***	0.651	0.16***
Education 3	0.555	0.113***	0.979	0.164***
Union membership: yes	-0.183	0.095*	-0.572	0.155***
Homeownership	0.013	0.083	0.235	0.13*
Year (Reference: 2001)				
2002	0.344	0.139**	0.686	0.23***
2003	0.41	0.15***	0.664	0.248***
2004	0.287	0.183	-0.684	0.458
2005	0.899	0.172***	-0.26	0.428
2006	-0.025	0.14	2.046	0.19***
2007	0.343	0.138**	-0.481	0.308
2008	0.219	0.133	-0.695	0.315**
Objective work characteristics				
Income	-0.011	0.068	-0.373	0.09***
Working hours	0.012	0.004***	0.014	0.006**
Job (in-)security	0.189	0.055***	0.12	0.09
Risk of unemployment	0.131	0.017***	-0.033	0.03
(Intercept)	7.044	0.758***	-1.124	1.207
Observations		4,301		
LR chi2 (dof)		1,252.91 (50)		
Mac Fadden		0.1699		
AIC		6,223.63		
BIC		6,554.69		
Log Likelihood (dof)		-3,059.81		

Notes: * Denotes parameter significant at 10%, ** at 5%, *** at 1%.

In our new estimates, while size and significance of the parameters for the level of pecuniary and nonpecuniary satisfaction do not change meaningfully in both the quitters and the emergent entrepreneurs sample, implying that most of the main effects of long-run satisfaction persist even after controlling for

possible interaction effects, the inclusion of interactions moderates the significance of all estimated coefficients for variations in job satisfaction.⁸

However, according to the non-significant effects found for every interaction between satisfaction levels and variations – with the only exception of quitters’ reaction to nonpecuniary satisfaction – we cannot accept the hypothesis that long-run satisfaction influences one worker’s reaction to recent shocks in subjective work assessments. As for the significant and negative effect of the interaction between levels and variations in nonpecuniary satisfaction found for the quitters, we will interpret this effect as the different reactions that individuals with higher, respectively lower levels of job satisfaction can reveal with respect to recent variations in job satisfaction. According to our results, the former will react more negatively (significantly decreasing their probabilities to quit) to increases in job satisfaction than the latter, that are less reactive. In other words, persistently dissatisfied people will tend to absorb negative shocks in job satisfaction, while historically satisfied people – which are more used to favourable work conditions or simply are more optimistic – will react more radically by leaving their job.

⁸ These results are apparently affected by the choice of the multinomial framework, where each effect is estimated by considering deviations from a reference group (i.e., the stayers). Preliminary evidence using a logistic framework (without the benchmark), shows that interactions matter. Alternatively, the assumption that the error terms are iid might be relaxed using a nested logit (Williams, 1977), that allows for the existence of correlation in a group of alternatives. Furthermore, there are models that consider more than one random component, allowing for the presence of both correlation and heteroskedasticity (mixed logit). We agree that further research is needed in this regard.

5. Conclusions

The recent surge of self-employment in Switzerland, providing no exception in the international context, has raised the attention of the academic community and of the public on the effects of small business growth on economic development. The strong belief that small businesses foster innovation and competitiveness has led to a number of policy interventions aiming to encourage start-up activities, although their effects are often disputed.

Nevertheless, it is important to investigate the reasons why individuals choose self-employment, and why they do it despite lower protection, higher risks, and possibly more effort than what is offered in a comparable wage employment position.

Using microdata from a panel of Swiss individuals for the time period 1999–2008, we investigate the factors that are expected to affect probabilities of choosing self-employment (and, alternatively, of just quitting his job), given a previous employment position.

We show that job satisfaction variables significantly affect transition probabilities of both self-employment candidates and job quitters. However, the effects are different for the two groups. Those who choose self-employment tend to do so in reaction to low levels of pecuniary satisfaction (while their level of nonpecuniary satisfaction is higher than the one reported by the reference group of stayers). Job quitters are more reactive to nonpecuniary dissatisfaction. Variations in job satisfaction are also found to significantly influence transition probabilities, even if their effects are absorbed by the interaction terms once we control for threshold effects. Finally, the quitters have been found to be particularly reactive to negative shocks in job satisfaction if they experienced initially high satisfaction levels.

The distinction between pecuniary and nonpecuniary satisfaction allows us to uncover different effects of subjective job assessments on transition probabilities, that a single satisfaction measure would not capture. Moreover, variations in job satisfaction were found to significantly affects transition probabilities.

From a policy point of view, the divergent reactions of the job quitters and the emergent entrepreneurs samples with respect to (time and cross-sectional) differences in pecuniary and nonpecuniary satisfaction suggest that, on the one hand, managers should pay more attention to their coworkers that are dissatisfied with actual work conditions if they want to reduce turnover (since job quitters have been found to be particularly exposed to such issues), while on the other hand, they should care about pecuniary dissatisfied coworkers if their aim is to reduce risks of future competition (given their enhanced probabilities to switch towards self-employment). Moreover, it is likely that, given the dominance of levels over variations in job satisfaction, people will tend to absorb temporary shocks in job satisfaction without changing their perception about the alternatives. Therefore, more attention is needed for those individuals that show persistent low (or high) satisfaction levels.

Finally, it would be definitely interesting to test whether job quitters and emergent entrepreneurs will find better conditions, once the choice been made.

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References

- Acs, Z., Armington, C. 2004 Employment Growth and Entrepreneurial Activity in Cities, Discussion Paper on Entrepreneurship, Growth and Public Policy 13/2004, Max Planck Institute for Research into Economic Systems, Jena.
- Akerlof G.A., Rose A.K., Yellen J.L., Ball L., Hall R.E. (1988) Job Switching and Job Satisfaction in the U.S. Labor Market, *Brookings Papers on Economic Activity* 1988 (2) 495-594
- Bartel A.P., Borjas G.J. (1981) Wage Growth and Job Turnover: An Empirical Analysis, in Rosen S. (ed.), *Studies in Labor Markets*, The University of Chicago Press: Chicago, 65 – 90
- Birch D. (1979) *The Job Generation Process*, Cambridge, MA: Center for the Study of Neighborhood and Regional Change, Cambridge: MIT Press
- Birchmeier U. (2000) L'essor de l'emploi indépendant en Suisse, *La Vie économique* 10, 52-56
- Black J., DeMeza D., Jeffreys D. (1996) House Prices, the Supply of Collateral and the Enterprise Economy. *Economic Journal* 106 (434), pp. 60-75
- Blanchflower D.G. (2000) Self-employment in OECD countries. *Labour Economics* 7, pp. 471-505
- Blanchflower D.G., Freeman R.B. (1997) The attitudinal legacy of communist labor relations. *Industrial and Labor Relations Review* 50 (3), 438-459
- Blanchflower D.G., Oswald A.J. (1998) What Makes an Entrepreneur? *Journal of Labor Economics* 16 (1), pp. 26-60
- Blau D. (1985) Self-Employment and Self-Selection in Developing Country Labor Markets. *Southern Economic Journal* 52, pp. 351-63
- Brock W.A., Evans, D.S. (1986) *The Economics of Small Businesses: Their Role and Regulation in the U.S. Economy*, New York: Holmes and Meier
- Brockhaus R. (1982) The psychology of the entrepreneur, in Kent C., Sexton D. and Vesper K. (eds), *Encyclopedia of Entrepreneurship*, Englewood Cliffs, NJ: Prentice-Hall.
- Clark A.E. (2001) What really matters in a job? Hedonic measurement using quit data, *Labour Economics* 8(2), 223-242
- Clark A.E., Georgellis Y., Sanfey P. (1998) Job satisfaction, wage changes and quits: evidence from Germany. *Research in Labor Economics* 17, 95–121
- Clark A.E., Oswald A.J. (1996) Satisfaction and comparison income, *Journal of Public Economics* 61(3), 359-381
- Dunne T., Roberts M., Samuelson L. (1987) *The Impact of Plant Failure on Employment Growth in the U.S. Manufacturing Sector*, unpublished manuscript, Pennsylvania State University
- Evans D.S. (1987a) Firm Growth, Size, and Age: Estimates for 100 Manufacturing Industries. *Journal of Industrial Economics* 35, pp. 567-82.
- Evans D.S. (1987b) Tests of Alternative Theories of Firm Growth. *Journal of Political Economy* 95, pp. 657-74

- Evans D.S., Jovanovic B. (1989) An Estimated Model of Entrepreneurial Choice under Liquidity Constraints. *Journal of Political Economy*, 97 (4), pp. 808-827
- Evans D.S., Leighton L.S. (1989a) Small business formation by unemployed workers, *Small Business Economics*, 2, pp. 319-30
- Evans D.S., Leighton L.S. (1989b) Some Empirical Aspects of Entrepreneurship. *The American Economic Review*, 79 (3), pp. 519-535
- Falter J.-M. (2001) Self Employment Entry and Duration in Switzerland. Papers from the 13th EALE Annual Conference, Jyväskylä Finland
- Falter J.-M., Ferro-Luzzi G., Flückiger Y. (1998) Travail à temps partiel et indépendants en Suisse: éléments d'explication de l'évolution récente. *Sécurité sociale*, 3
- Flanagan R.J., Strauss G., Ulman L. (1974) Worker discontent and work place behavior. *Industrial Relations* 13, 101-123
- Flückiger Y., Ferro Luzzi G. (2001) Le travail indépendant en Suisse, Demain la Suisse (scientific report), Bern Switzerland
- Freeman R.B. (1978) Job Satisfaction as an Economic Variable, *The American Economic Review (AER)*, 68(2), 135-41
- FSO (2000) Federal Population Census, Neuchâtel: FSO
- FSO (2011a) Statistical Yearbook 2011, Zurich: Verlag Neue Zürcher Zeitung, 95-109
- FSO (2011b) Statistisches Jahrbuch der Schweiz 2011 - Digital, CD-Rom
- Gottschalk P., Maloney T. (1985) Involuntary Terminations, Unemployment, and Job Matching: A Test of Job Search Theory, *Journal of Labor Economics* 3(2), 109-123
- Greene, W. H. (2008) *Econometric Analysis*. 6th ed. Upper Saddle River, NJ: Prentice-Hall, 843-845
- Hamilton B.H. (2000) Does Entrepreneurship Pay? An Empirical Analysis of the Returns to Self-Employment. *The Journal of Political Economy* 108 (3), pp. 604-631
- Hawley C.B., Fujii E.T (1991) Empirical aspects of self-employment, *Economics Letters* 36 (3), 323-329
- Henley A. (2005) Job Creation by the Self-employed: The Roles of Entrepreneurial and Financial Capital. *Small Business Economics* 25, pp. 175-196
- Hofstede G. Noorderhaven N.G., Thurik A.R. Uhlaner L.M., Wennekers A.R.M. and Wildeman R.E. (2004) Culture's role in entrepreneurship: self-employment out of dissatisfaction, in Brown T.E. and Ulijn J. (eds.) *Innovation, Entrepreneurship and Culture*, Cheltenham: Edward Elgar
- Holtz-Eakin D., Joulfaian D., Rosen H.S. (1994) Entrepreneurial Decisions and Liquidity Constraints, NBER Working Paper No. 4526
- Jovanovic B. (1982) The Selection and Evolution of Industry. *Econometrica* 50, pp. 649-70
- Kihlstrom R., Laffont, J.-J. (1979) A General Equilibrium Theory of Firm Formation Based on Risk-Aversion. *Journal of Political Economy* 87, pp. 719-48

- Lazear E.P., Moore R.L. (1984) Incentives, Productivity, and Labor Contracts, *The Quarterly Journal of Economics* 99 (2): 275-296.
- Lévy-Garboua L., Montmarquette C., Simonnet V. (2007) Job satisfaction and quits, *Labour Economics* 14 (2), 251-268
- Lindh T., Ohlsson H. (1996) Self-employment and Windfall Gains: Evidence from the Swedish Lottery. *Economic Journal* 106 (439), pp. 1515-1526
- Lucas R.E. (1978) On the Size Distribution of Business Firms, *Bell Journal of Economics* 9, pp. 508-23
- McEvoy G.M., Cascio W.F. (1985) Strategies for reducing employee turnover: A meta-analysis. *Journal of Applied Psychology*, 70 (2), 342-353
- McFadden, D (1974) Conditional logit analysis of qualitative choice behaviour, in Zarembka P. (ed.) *Frontiers in Econometrics*, New York: Academic Press
- Pakes A., Ericson R. (1987) Empirical Implications of Alternative Models of Firm Dynamics, unpublished manuscript, Department of Economics, University of Wisconsin
- Rees H., Shah A. (1986) An Empirical Analysis of Self-Employment in the U.K. *Journal of Applied Econometrics* 1, pp. 95-108
- Reynolds, P.D., 1994 Autonomous Firm Dynamics and Economic Growth in the United States, 1986-90, *Regional Studies* 27, 429-442.
- Reynolds, P.D., 1999 Creative Destruction: Source or Symptom of Economic Growth? In Acs Z., Carlsson, B. and Karlsson C. (Eds), *Entrepreneurship, Small and Medium-sized Enterprises and the Macroeconomy*, Cambridge: Cambridge University Press.
- Rosen S. (1981) The Economics of Superstars, *American Economic Review* 71 (5)
- Shapiro A. and Sokol L. (1982) The social dimensions of entrepreneurship, in Kent C., Sexton D. and Vesper K. (eds), *Encyclopedia of Entrepreneurship*, Englewood Cliffs, NJ: Prentice-Hall.
- Taylor M. (2004) Self-employment in Britain: When, who and why? *Swedish Economic Policy Review* 11 (2004) 139-173
- Taylor M. (2004) Self-employment in Britain: When, who and why? *Swedish Economic Policy Review* 11(2004) 139-173
- Taylor M.R. (1996) Earnings, independence or unemployment: Why become self-employed?, *Oxford Bulletin of Economics and Statistics* 58 (2), 253-266
- Wennekers A.R.M., Noorderhaven N.G., Hofstede G. and Thurik A.R. (2001) Cultural and economic determinants of business ownership across countries, in Bygrave W.D. et al. (eds), *Frontiers of Entrepreneurship Research 2001*, Wellesley, MA: Babson College, pp. 179-90
- Williams, H.C.W.L. (1977) On the formation of travel demand models and economic evaluation measures of user benefit, *Environment and Planning* 9A, 285-344

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