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Jari Ritsilä and Hannu Tervo
University of Jyväskylä
School of Business and Economics
Centre for Economic Research
P.O. Box 35
FIN-40351 Jyväskylä
FINLAND
Tel. +358 14 2603 165
Fax +358 14 2603 343
mailto:jarrits@tase.jyu.fi

EFFECTS OF UNEMPLOYMENT ON NEW FIRM FORMATION: MICRO-LEVEL PANEL DATA EVIDENCE FROM FINLAND

Abstract. This paper aims to provide a comprehensive insight into the role that unemployment plays in influencing new firm formation. Panel data models and micro-level data are used to help achieve this objective. We endeavour to identify simultaneously the separate effects of personal, regional and national unemployment on new firm formation in Finland for the period 1987-1995. The results indicate considerable evidence for a positive and non-linear effect of personal unemployment on the likelihood of an individual to become an entrepreneur. The findings also indicate that the economic situation has an effect on firm formation: times of low unemployment and business prosperity favour entrepreneurship. On the other hand, the analysis gives no clear evidence of the regional unemployment situation affecting the likelihood of founding a business.

Keywords: new firm formation, unemployment, panel data

JEL: O18, M13, M21

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1 Introduction

The relationship between unemployment and new firm formation is not clear-cut. The analytical problem involved in examining the impact of unemployment on new enterprise formation is an antithesis between the so-called "push" and "pull" hypotheses. The push motivation can be defined as circumstances wherein an individual feels forced to establish a new enterprise due to negative labour prospects, such as personal unemployment and job insecurity. In these situations, individuals may consider the formation of a business as their best choice (Storey 1991; Marlow and Storey 1992; Tervo and Niittykangas 1994). In turn, the pull factors are those where an individual is attracted primarily by the prospect of founding a business. The pull hypothesis suggests that new business formation takes place when demand is high, and when an individual is creditworthy or has access to personal savings. In this sense, a positive decision to begin a business venture is more likely when the unemployment level is low, and an individual is employed and has access to assets necessary to start a firm. Previous studies provide evidence for both the push and pull effects of unemployment (see e.g. Storey 1982; Hamilton 1989; Evans and Leighton 1990; Storey 1991; Meager 1992; Marlow and Storey 1992; Audretsch 1993; Tervo and Niittykangas 1994; Spilling 1996; Thomas and Jungbauer-Gans 1999).

A still more complicated picture of the relationship between unemployment and new firm formation is obtained if we consider the effects of unemployment at three different levels, viz.: the personal level, regional level and national level. Studies often analyse the effect of unemployment at only one of these levels separately. Individual level - analyses are usually based on interviews with firm founders, in which case the relationship between unemployment and new firm formation is imperfectly addressed. In order to obtain a more comprehensive view, an examination of statistical data is needed. Marlow and Storey (1992) suggested that it is necessary to examine the findings of sta-

tistical studies on time series changes in data, for both of these variables, if a more rounded picture of the effect of unemployment on new firm formation is desired. Tervo and Niittykangas (1994) suggested using cross-sectional data from regions to analyse the impact of unemployment on new firm formation. Unfortunately, studies that deal with just one of these levels can only provide a partial answer to the question of the effects of unemployment. A comprehensive analysis presupposes micro-level panel data that combines time series and cross-sectional observations at the individual level.

The prime interest of our paper is to analyse the role that unemployment plays in new firm formation. Specifically, the paper attempts to analyse the direct effects of personal, regional and national unemployment on new firm formation at the individual level. Therefore, our approach is different compared with many other studies concerned with the relationship between unemployment and new firm formation at only one of the three levels.

The empirical analysis of this paper uses a micro-level panel data set from Finland. The panel data set covers the period from 1987 to 1995. The econometric estimations are based on the Random Effects Probit Model. The main benefit in using panel data stems from the fact that individuals are, then, assumed to be heterogeneous units. Hence, we are better able to control an individual's other characteristics, and therefore, are also better equipped to determine the pure effects of unemployment on the likelihood of starting a business.

The paper is organised as follows. First, the framework related to the effect of unemployment on new firm formation is introduced. Second, the econometric methods, data and variables are presented. Third, the results are reported. The paper ends in concluding remarks.

2 Unemployment and New Firm Formation

The potential effects of unemployment on new firm formation exist at three different levels, viz.: the personal level, regional level and national level.[1] Both pull and push forces may operate at each of these levels. First, the likelihood of choosing to found a business is related to the employment status of a worker. Because of the push factors, unemployed workers may have a greater propensity for becoming self-employed than employed workers (Evans and Leighton 1990; Storey 1982; Storey 1991; Meager 1992; Audretsch 1993; Thomas and Jungbauer-Gans 1999). There are, of course, pull forces which drive capable persons to entrepreneurship. Such individuals may have a desire to work for themselves; they may wish to realise their ambitions; they may feel the need to pursue a career, and so on. But in the case of unemployed persons, we may suppose that the push factors are dominant forces. The unemployed are explicitly pushed into founding their own firm by redundancy and income insecurity. Most unemployed individuals are dissatisfied with their present situation, whereupon some of them may consider entrepreneurship as their best choice. Entrepreneurship is, perhaps, not their dream, but rather the lesser of two "evils", the other "evil" being the present unsatisfactory situation. Without personal unemployment, a "push-entrepreneur" would not start a business.

Second, regional unemployment differentials may have an effect on new firm formation. The relationship between regional unemployment disparities and firm formation is not, however, unambiguous. Previous studies provide evidence for both push and pull effects (see e.g. Hamilton 1989; Storey 1991; Tervo and Niittykangas 1994; Spilling 1996). The push hypothesis argues that high regional unemployment incites self-employment and, consequently, regions with high unemployment have a high rate of new firm formation (Storey 1991; Keeble and Walker 1994; Reynolds, Storey and Westhead 1994). According to this argumentation, self-employment is considered as the last resort to ensure respectable livelihood in regions of high unemployment. The public sector also encourages entrepreneurship in these regions. The labour expenses in these regions are likely to be at a lower level due to the supply – demand effects of labour on local wage rates. Furthermore, a high unemployment level in a local economy is likely to coincide with the closure of enterprises, and hence lead to an increased availability,

as well as low cost, of second hand equipment and business premises.

It is, however, more likely that the pull of markets dominates at the intermediate, i.e. regional level. The pull hypothesis argues that a low local level of unemployment has a positive effect on new firm formation and, conversely, high local unemployment prevents firm formation. A low regional unemployment level indicates a high level of local demand as well as regional competitiveness and growth. It can be assumed that in such circumstances individuals are attracted into starting a businesses. In contrast, regions with a high unemployment level are lagging behind in an economic sense and their demand is at a low level. Long or frequent spells of unemployment also tend to lead to deterioration in labour force activity, and further on, to a weakening in the quality of human capital/labour force. This may result in "a vicious cycle", in which backwardness breeds further backwardness. Long or frequent spells of high local unemployment would certainly make the survival of newly based firms more insecure, and make the plans to ground a new business much less inviting.

Third, a high level of overall unemployment (business cycle effect) can be assumed to decrease new firm formation (e.g. Storey 1991; Audretsch 1993). The pull effect dominates at the national level. In a period of high national unemployment, both internal and external demand for local goods and services are low, and thus the survival possibilities of new firms are relatively slight. Because of the decreased probability of survival, an individual is faced with greater uncertainty (cost) and lower rates of return from becoming an entrepreneur.

Consequently, unemployment may affect new firm formation at three different levels. All these channels have to be taken into account in a comprehensive analysis of the effects of unemployment on firm formation. Our framework for the empirical analysis includes all these levels. The traditional push and pull effects are also integrated into the framework. To summarise, the hypotheses to be tested in the paper are: 1) Personal unemployment augments the likelihood of becoming an entrepreneur (push effect). 2) A high level of unemployment in a region has a negative effect on the likelihood of founding a business (pull effect). 3) A high national level of unemployment decreases new firm formation (pull effect).

3 Model, Data and Variables

In this study, attention is drawn to the decision-making of an individual and especially to the effect of unemployment on her/his likelihood of becoming an entrepreneur. The individual weighs the benefits of founding an enterprise against the costs of the process. Furthermore, the probability of becoming a self-employed entrepreneur is seen as a function of the personal factors of the potential entrepreneur, the characteristics of her/his home district and the business cycle. At a theoretical level, the likelihood of founding a firm is a form of a human capital investment problem. Accordingly, an individual establishes an enterprise if the net present value of expected benefits of firm formation exceeds the net present value of the costs involved (Evans and Leighton 1990; Tervo and Niittykangas 1994).

3.1 Modelling framework

The probability estimations of this paper are based on panel data, i.e. a data set of observations on a cross-section of individuals over several time periods. There are several benefits related to panel estimations. First, panel data assumes that individuals are heterogeneous. A panel analysis is able to control individual- and time-invariant variables, whereas a time series or a cross-section study cannot. For example, in our panel analysis of the effects of unemployment on the likelihood of becoming an entrepreneur, we are able to control both the individual and time specific characteristics and, therefore, we are also better equipped to determine the pure effects of unemployment on the likelihood of starting a business.

Second, a panel data set gives more information, more variability, less collinearity among variables, more degrees of freedom and more efficiency to estimations. Third, panel data opens up better possibilities of examining the dynamics involved in the analysis. Indeed, panel data estimation can relate an individual's experiences and behaviour at one point in time to other experiences and behaviour at other points in time. For example, this study analyses the effects of personal unemployment at time t on the likelihood of founding a firm in the period t+1. Fourth, panel data models allow us to

construct and test more complex behavioural models than purely time series or cross-section models (Baltagi 1995; Hsiao 1986; Greene 1997).

A probit model based on a panel data set does not lend itself to the treatment of fixed effects, whereas it is suitable in the specification of random effects. With the random effects model, the maximum likelihood estimation yields consistent estimates of the coefficients β. The random effects model used in the analysis herein is estimated according to Butler and Moffitt's (1982) derivations (see also Greene 1998), formally:

(1) $y_{it}^* = \beta_*' x_{it} + u_i + v_{it}, \ i = 1,...,N, \ t = 1,...,T, \ \beta = \dfrac{\beta_*}{\sigma_v}$,

$\quad y_{it} = 1 \ if \ y_{it}^* > 0 \ and \ 0 \ otherwise,$

$\quad Var[u_i + v_{it}] = Var[\varepsilon_{it}] = \sigma_u^2 + \sigma_v^2$,

$\quad Corr[\varepsilon_{it}, \varepsilon_{is}] = \rho = \dfrac{\sigma_u^2}{(\sigma_u^2 + \sigma_v^2)}$.

Accordingly, the log-likelihood function for the random effects model this paper uses is

(2) $\quad L = \prod_i L_i$, $\ so \ \ln L = \sum_i \ln L_{i.}$

The terms are

$\quad L_i = \displaystyle\int_{-\infty}^{\infty} \frac{1}{(2\pi)^{1/2}} \ e^{-\varepsilon_i^2/2} \prod_{t=1}^{T_i} \Phi(r_{it} z_{it}) d\varepsilon_i$,

where

$\quad r_{it} = 2y_{it} - 1$

and

$\quad z_{it} = \beta' x_{it} + \left[\ [\rho/1 - \rho]^{1/2} \varepsilon_i \right].$

The Butler and Moffit formulation is largely accepted to be a satisfactory compromise between a fully unrestricted model and a cross-section variant, which misses the correlation altogether. An advantage of using the Butler and Moffit procedure is that the model can be efficiently estimated, even with fairly large T_i, using conventional computational methods (For further details see Hsiao 1986; Maddala 1987; Baltagi 1995; Greene 1997; Greene 1998).

3.2 The data set and the econometric specifications

The empirical analysis is based on the Finnish Longitudinal Census data and the Longitudinal Employment Statistics (a supplement to the Finnish Longitudinal Census) from the period of 1987 to 1995. Our micro data set is a 0.2 percent random sample taken from the census file and contains data on population characteristics, including information about individuals' labour market status, dwelling conditions, family and home district. The analysis focuses on persons who were of working age throughout the whole period of 1987 to 1995.[2] The sample size is 5,636 individuals.

The dependent dummy variable (**new entrepreneur**) indicates whether a person is a new entrepreneur. The position of an entrepreneur is registered on the basis of an individual's profession in the last week of the observation year. Accordingly, an individual is stated as a new entrepreneur if s(he) is registered as an entrepreneur in the last week of year **t + 1** but not in the last week of year **t**.

The analysis of the effects of personal unemployment is bipartite. Firstly, we examine the effect of **unemployment status** on the likelihood of founding a business by using a personal unemployment dummy. An individual is registered as unemployed if s(he) has been unemployed at least two weeks in the observation year. Secondly, we analyse the effect of the **length of the personal unemployment period** on the likelihood of forming a firm. The variable we exploit measures the length of a person's unemployment period in months.[3] In addition, we use the square of the personal unemployment period in order to test if the effect of personal unemployment is a non-linear one. Further on, we also use a specification with dummies characterising the length of the unemployment period in order to get a clearer picture of the phenomenon. The effect of the length of the unemployment period on the firm formation likelihood is expected to be non-linear. This is due to dynamics in the expected costs and benefits related to becoming an entrepreneur, including changes in social, psychological and economical factors.

The dummy variable[4] of **a high local unemployment level** is used to characterise the regional unemployment level an individual confronts. The dummy of the high local unemployment level receives a value of one if the local unemployment rate is above the

mean, and zero otherwise. Due to the data available, the unemployment rate we exploit is based on the level of travel-to-work areas determined by Statistics Finland (1994).[5]

A change in the national unemployment level is measured with a **business cycle** dummy. The dummy operates as a rough estimate for a turning point in the national business cycle. The dummy is assigned a value of one if the observation year lies between the years 1987 and 1989. This was a boom period with a low national level of unemployment. The deep economic crisis in the beginning of the 1990s sharply cut the number of jobs in all regions. National unemployment rose dramatically, and was at a high level throughout the rest of the study period.

Our control variables are those which have been typically used in different studies. They include commonly exploited factors describing an individual's personal and household characteristics as well as variables characterising the home district of an individual (see e.g. Liles 1974; Townroe and Mallalieu 1993; Tervo and Niittykangas 1994; Koskinen 1996).[6] Further details on the variables used in the estimations are presented in Table I.

(TABLE I)

4 Empirical Results

4.1 Effects of unemployment on the likelihood of founding a business

Table II reports the estimated equations of the first stage of the analysis, in which the unemployment status is used in the analysis of the effects of personal unemployment. We use two different specifications, the first one including all the variables, and the second only those which are statistically significant at the 5% level. The data exploited herein is consistent with the random effects model since the coefficient of ρ is statistically significant.

(TABLE II)

Almost all the signs of the estimated coefficients are in line with the expectations presented in Table I. Below, we examine Specification 2 more thoroughly. The dummy measuring personal unemployment shows a positive coefficient. Thus, personal unemployment seems to increase the likelihood of self-employment. Since marginal effects are computable here, the sizes of the effects are also traceable. The marginal effects reported here are computed by using the means of variables. The overall likelihood of founding a business is 1.10%. If the dummy indicating an individual to be unemployed is assigned a value of one, while keeping the other variables constant, the likelihood of self-employment increases by a 0.26% unit, resulting in a total 1.36% unit.[7] From this it follows that the likelihood of founding a business increases, in relative terms, by nearly a fourth (24%) in the case of an unemployed person.

The estimated coefficient for the dummy expressing high regional unemployment does not reach statistical significance in Specification 1, and hence it is excluded from Specification 2. Accordingly, we cannot show that unemployment has an effect on new firm formation at the regional level. Besides, the estimated coefficient is positive in accordance with the push hypothesis. This is contrary to our hypothesis, but as the statistical significance is far from acceptable levels, we can ignore this result.

Our third hypothesis was related to the business cycle effect. The positive coefficient of the business cycle dummy is in accordance with our hypothesis. This result shows that the boom years from 1987 to 1989 encouraged self-employment. The marginal effect related to the business cycle dummy was 0.17%. Thereby, unemployment at the national level seems to have a clear effect on entrepreneurship. Ceteris paribus, new firm formation is increased by over 15% in a period of low unemployment compared with a period of high unemployment.

The estimated signs of the other explanatory variables are in line with the expected outcomes. The statistically significant factors augmenting the likelihood of founding a business include a high level of educational attainment, a fragmentary employment history, a large household size and an age between 26-40 years. The dummy of frag-

mentary employment history shows the largest marginal effect of 0.73% unit, meaning 66% increase in the likelihood of founding a business. The positive effect of fragmentary employment can be explained, among other reasons, by the decreased opportunity costs of founding a firm as an individual experiences short employment periods instead of having a constant job. The level of educational attainment also seems to correlate positively with the likelihood of new business formation. This partly relates to increased professional and economic opportunities (entrepreneurial qualifications) of educated persons to launch a business (see e.g. Johnson 1981; Tervo and Niittykangas 1994). The positive effect of the size of a household can be connected to the increased responsibility that comes with a family. Accordingly, an individual with a family faces an extra push when trying to gain a living. Furthermore, the positive coefficient of the age variable is in accordance with a number of previous findings (see e.g. Liles 1974; Koskinen 1996). The age of 26 to 40 can be considered as a period of freedom with regard to the choice of occupation.

Possessing a high level of income and being a female both decrease the likelihood of self-employment. The negative coefficient of the income level variable can be explained by the increased opportunity costs involved in the business formation process at high-income levels. The decreased likelihood of females forming a firm relates to the same factors that are behind women's low level of labour market participation. These include, for example, traditional role concepts and family responsibilities.

In addition to these variables, we used regional dummies to control for other characteristics of an individual's home district than just its unemployment level. These dummies were based on the province a person lives in, the reference region being Uusimaa. Of these dummies, the only one reaching statistical significance was the dummy of Etelä-Karjala. In Etelä-Karjala, new firm formation is less active than in Uusimaa. The industrial structure of Etelä-Karjala is based on large-scale industry. Thus, our result affirms the well-known fact that, ceteris paribus, people who are used to earning their living in large-scale plants do not easily found a business.

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4.2 Duration of unemployment and business formation

In this section, we look more closely at the interrelation between personal unemployment and the likelihood of business formation, by examining the effects of unemployment duration on the propensity for becoming an entrepreneur. Table III presents the estimated equations. Two different specifications are used in order to illustrate the effect of the unemployment period.

(TABLE III)

Specification 3 uses the length of the unemployment period (in months) and its square to reveal the form of the effect the unemployment period has on the likelihood of founding a firm. The personal unemployment variables, the length of the unemployment period and its square, show statistically significant coefficients. Accordingly, we can interpret the overall effect of personal unemployment as non-linear. Defining the magnitude and the shape of the effects is rather complicated in the case of a quadratic explanatory variable and a panel probit model based on panel data. Therefore, we proceed with periodical dummies in specification.

The reference group of the dummy-construction is employed persons. The coefficients of the estimated equation verify that the effect of personal unemployment on the likelihood of becoming self-employed is associated with variations in the duration of the unemployment period. The first two dummies (x_5 and x_6) together express an unemployment period of one to six months. The signs of the estimated coefficients of these variables are positive and the coefficients are statistically significant. The third dummy (x_7) also receives a positive coefficient, and it almost reaches statistical significance at the 5% level, whereas the sign of the estimated coefficient of the fourth dummy (x_8) is negative. The coefficient is not, however, statistically significant.

Taken as a whole, personal unemployment clearly does augment the likelihood of founding a business. The effect of the unemployment duration on the likelihood of becoming self-employed is non-linear. The propensity for founding a firm is greater in the early stages of unemployment. A long unemployment period might even discourage self-employment. This indicates that prolonged unemployment leads to decreased la-

bour market activity and deterioration in the quality of entrepreneurial qualifications, such as professional skills and liquidity.

5 Concluding Remarks

This study aimed to give a comprehensive picture of the effects which unemployment, through different channels, has on the likelihood of a worker to become a self-employed. Our hypothesis was that both pull and push forces influence entrepreneurship at different levels. The results, related to the situation of Finland in 1987-1995, revealed the following:

1. We found considerable evidence for the incentive effect of personal unemployment on the likelihood of an individual to become an entrepreneur. This was according to our hypothesis that the push forces dominate at the personal level.

2. The effect of regional unemployment on business formation could not be shown in the analysis. This may be due to the fact that the push and pull forces are of equal size, the net effect being nil. Our hypothesis was, however, that the pull forces dominate at the regional level.

3. A high national level of unemployment decreased the likelihood of new firm formation. The pull effect was also according to our expectations.

Related to the effects of personal unemployment, our results also showed that the effect of unemployment duration on the likelihood of forming a business is non-linear. Perhaps due to psychological, social and public sector factors, the unemployment status affects individuals differently in the various stages of the unemployment period. The propensity for founding a business is increased in the early stages of unemployment, while a longer unemployment period might even discourage ambition for self-employment.

Footnotes

[1] Here we have the same idea as in the analysis of the effects of unemployment on migration: unemployment has a possible effect on labour mobility both at the personal, regional and national level (cf. Pissarides and Wadsworth 1989; Ritsilä and Tervo 1999; Tervo 2000).

[2] The sample includes persons aged 16 to 57 in 1987, aged 17 to 58 in 1988 and so on, respectively, reaching the age of 24 to 65 in 1995. Accordingly, the data set forms an unbiased follow-up file.

[3] If a person has been unemployed at least two weeks in the observation year, a one-month period of unemployment is reported.

[4] In order to avoid a pitfall related to an integration of aggregate and micro units in the same model, dummy variables are exploited here at the regional level (for further details, see e.g. Moulton 1986; Moulton and Randolph 1989; Moulton 1990).

[5] The travel-to-work areas are based on the classification by Statistics Finland for the year 1994. The number of these areas has varied in the study period, altogether being approximately 200.

[6] The public sector grants for new enterprises are also included in some models, but unfortunately, it was not available in reliable format in the data set exploited. However, the usage of a variable characterising the public sector benefits would have been quite problematic, since the beneficiary is required to be unemployed and s(he) must also start a business, which is actually the dependent variable of our analysis.

[7] For computational reasons, the reference business formation rate (1.1%) exploited throughout the empirical part of the paper is based on the sample mean of observations (see table I).

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Table I The Variables Exploited in the Panel Data Probit Model (all periods, all observations)

VARIABLE		DEFINITION	MEAN	PREDICTED OUTCOME
DEPENDENT VARIABLE (Time period t + 1)				
Y	New entrepreneur	$Y=1$ if an individual is registered as an entre-preneur in the last week of the observation year but not in the last week of the previous year. $Y=0$ else	0.0110 (= 434 new enter-prises)	-
KEY EXPLANATORY VARIABLES (Time period t)				
X_1	Personal unemploy-ment dummy	$X_1=1$ if a person has been unemployed at least 2 weeks in the observation year $X_1=0$ else	0.1614	+
X_2	Regional unemploy-ment dummy	$X_2=1$ if the regional unemployment state exceeds the mean of the travel-to-work areas $X_2=0$ else	0.5096	-
X_3	Unemployment period	Period of unemployment in months	0.9428	+
X_4	Unemployment period^2	Period of unemployment to the second power	7.6952	+ / -
X_5	Unemployment period dummy of 1-3 months	$X_5=1$ if unemployment period 1-3 months $X_5=0$ else	0.0401	+ / -
X_6	Unemployment period dummy of 3-6 months	$X_6=1$ if unemployment period 3-6 months $X_6=0$ else	0.0419	+ / -
X_7	Unemployment period dummy of 6-9 months	$X_7=1$ if unemployment period 6-9 months $X_7=0$ else	0.0360	+ / -
X_8	Unemployment period dummy of 9-12 months	$X_8=1$ if unemployment period 9-12 months $X_8=0$ else	0.0434	+ / -
CONTROL VARIABLES (Time period t)				
X_9	Female	$X_9=1$ if an individual is female $X_9=0$ else	0.4956	-
X_{10}	Age 18 -25	$X_{10}=1$ if age $\geq$ 18 but $\leq$ 25 $X_{10}=0$ else	0.1430	+
X_{11}	Age 26 -40	$X_{11}=1$ if age 26 but $\leq$ 40 $X_{11}=0$ else	0.4013	+
X_{12}	Student	$X_{12}=1$ if an individual is reported as a student on the basis of the main type of activity in the last week of the observation year $X_{12}=0$ else	0.0520	-
X_{13}	Educational attainment	Level of educational attainment (Finnish Standard Classification of Education 31.12.1994)	2.3560	+
X_{14}	Commute	$X_{14}=1$ if the location of an individual's job is different from her/his municipality of residence at the end of the observation year $X_{14}=0$ else	0.1818	+
X_{15}	Fragmentary work	$X_{15}=1$ if a person has experienced termi-nated employment at least twice in the obser-vation year $X_{15}=0$ else	0.0422	+
X_{16}	Level of income	$X_{16}=1$ if the level of income exceeds the mean $X_{16}=0$ else	0.4364	-
X_{17}	Size of household	Size of a household unit	3.1016	+ / -
X_{18}	Business cycle	$X_{18}=1$ if the observation year is from 1987 to 1989 $X_{18}=0$ else	0.2857	+
$X_{19} ... X_{36}$	Regional dummies	$X_{19} ... X_{36}=1$ if an individual lives in the province $X_{19} ... X_{36}=0$ else	-	+ / -

Table II Random Effects Binomial Probit Estimate for Probability of Founding a Business

	Variable	SPECIFICATION 1 β	SPECIFICATION 1 $P[\|Z\|>z]$	SPECIFICATION 1 Marginal Effects	SPECIFICATION 2 β	SPECIFICATION 2 $P[\|Z\|>z]$	SPECIFICATION 2 Marginal Effects
	Constant	-2.7572*	0.0000	-0.0444	-2.6873*	0.0000	-0.0436
X_1	Personal unemployment	0.1641*	0.0026	0.0026	0.1630*	0.0011	0.0026
X_2	Regional unemployment	0.0364	0.5301	0.0006	-	-	-
X_9	Female	-0.1879*	0.0000	-0.0030	-0.1839*	0.0000	-0.0030
X_{10}	Age 18-25	0.0005	0.9939	0.0000	-	-	-
X_{11}	Age 26-40	0.0856	0.0769	0.0014	0.0923*	0.0277	0.0015
X_{12}	Student	0.0092	0.9154	0.0001	-	-	-
X_{13}	Educational attainment	0.0317*	0.0058	0.0005	0.0320*	0.0042	0.0005
X_{14}	Commute	0.0812	0.1422	0.0013	-	-	-
X_{15}	Fragmentary work	0.4390*	0.0000	0.0071	0.4469*	0.0000	0.0073
X_{16}	Level of income	-0.2805*	0.0000	-0.0045	-0.2758*	0.0000	-0.0045
X_{17}	Size of household	0.0630*	0.0000	0.0010	0.0623*	0.0000	0.0010
X_{18}	Business cycle	0.1279*	0.0342	0.0021	0.1067*	0.0172	0.0017
X_{19} ... X_{36}	Regional control dummies[1]						
	Rho	0.1233*	0.0013	-	0.1271*	0.0005	-

	Individuals	=	5,636
	Periods	=	7
	$P[\|Z\|>z]$	=	Probability value of the estimated coefficient
	*	=	Statistically significant at the 5% level

[1]The dummy of Etelä-Karjala was the only regional control dummy reaching statistical significance at the 5% level.

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Table III Random Effects Binomial Probit Estimate for Probability of Founding a Business

	Variable	SPECIFICATION 3 β	$P[|Z|>z]$	Marginal Effects	SPECIFICATION 4 β	$P[|Z|>z]$	Marginal Effects
	Constant	-2.6651*	0.0000	-0.0437	-2.6751*	0.0000	-0.0435
X_3	Unemployment period	0.0741*	0.0021	0.0012	-	-	-
X_4	Unemployment period^2	-0.0066*	0.0071	-0.0001	-	-	-
X_5	Unemployment period dummy of 1-3 months	-	-	-	0.2290*	0.0070	0.0037
X_6	Unemployment period dummy of 3-6 months	-	-	-	0.2105*	0.0094	0.0034
X_7	Unemployment period dummy of 6-9 months	-	-	-	0.1741	0.0591	0.0028
X_8	Unemployment period dummy of 9-12 months	-	-	-	-0.0089	0.9321	-0.0001
X_9	Female	-0.1886*	0.0000	-0.0031	-0.1875*	0.0000	-0.0030
X_{11}	Age 26-40	0.0929*	0.0265	0.0015	0.0934*	0.0270	0.0015
X_{13}	Educational attainment	0.0313*	0.0051	0.0005	0.0311*	0.0058	0.0005
X_{15}	Fragmentary work	0.4421*	0.0000	0.0072	0.4337*	0.0000	0.0071
X_{16}	Level of income	-0.2855*	0.0000	-0.0047	-0.2809*	0.0000	-0.0046
X_{17}	Size of household	0.0619*	0.0000	0.0010	0.0620*	0.0000	0.0010
X_{18}	Business cycle	0.0999*	0.0260	0.0016	0.0988*	0.0280	0.0016
	Rho	0.1249*	0.0006	-	0.1258*	0.0005	-

Individuals	=	5,636
Periods	=	7
$P[|Z|>z]$	=	Probability value of the estimated coefficient
*	=	Statistically significant at the 5% level