Int Entrep Manag J (2008) 4:171–186
DOI 10.1007/s11365-007-0060-1

Firm entry and exit in Italian provinces and the relationship with unemployment

Martin Carree · Enrico Santarelli · Ingrid Verheul

Published online: 16 November 2007

Abstract This study investigates the influence of the unemployment rate on firm entry, exit and net entry in Italian provinces. We attempt to explain these market dynamics in six different sectors, including manufacturing, construction, commerce, hotels and restaurants, transport and financial services. We control for other regional factors, such as patenting activity, economic growth, economic welfare, tourism, industrial districts and whether being a major city. Findings indicate that the effects of unemployment on entry and exit are dependent upon the sector under study, but are mainly negative. This suggests a lack of dynamics in the Italian regional labor markets.

Keywords Firm entry and exit · Unemployment · Italian provinces

Labor market conditions can vary considerably across regions and localities in the same country. Unemployment may be almost absent in some regions, while in others it is high. These differences are often of a structural nature and the government may want to intervene to reduce such regional inequalities. For example, new economic activity can be subsidized in the poorer regions next to efforts to raise entrepreneurial awareness and enhance entrepreneurial skills in society. A typical circumstance under which the latter kind of intervention may be a preferred policy is when in a region there is high unemployment and a low propensity to start new

M. Carree (✉)
University of Maastricht, Maastricht, The Netherlands
e-mail: m.carree@os.unimaas.nl

E. Santarelli
University of Bologna, Bologna, Italy

I. Verheul
Erasmus University Rotterdam, Rotterdam, The Netherlands

firms. Policy may encourage unemployed individuals to start new firms to escape their current labor market position.

Evans and Leighton (1990) showed evidence that unemployed individuals are about twice as likely to start a new firm as employed workers. Evidence of an 'unemployment push' effect at the regional level is however limited (Carree 2002). An important reason for a lack of evidence for the 'unemployment push' hypothesis is that unemployment may be an indicator of a depressed economic environment and that the unemployed on average have less entrepreneurial capital available as compared to employed individuals. In addition, the opportunities for new venture creation may be different across sectors. In small-scale easy-to-enter industries a positive effect of the unemployment rate on the start-up rate of firms may be expected (Audretsch and Fritsch 1999).

Regional or local unemployment rates may not only affect the firm entry rate, but also the firm exit rate. In the literature there has not been much attention for firm exit when explaining the net contribution of unemployment to the change in the regional firm population. Self-employed individuals may be reluctant to close the business if there are no job alternatives available. In this respect unemployment may not only have a positive effect on entry but also a negative effect on exit. This paper investigates the effect of unemployment on (subsequent) firm entry, exit and net entry at the industry level using Italian regional data. In Italy there are regions (in the North) with very low unemployment rates as well as regions (in the South) with very high unemployment rates. Hence, Italy is an interesting country to explore the role of unemployment in the entry and exit processes of firms. We distinguish between six (broad) sectors, including manufacturing, construction, commerce, hotel and restaurants, transport and financial intermediation.

The determinants of self-employment can be investigated at the individual or aggregate level (Pfeiffer and Reize 2000). At the individual level the focus is on the decision of an individual to become an entrepreneur, whether at a more aggregate level regional variation in new firm formation is central.[1] This study takes the latter perspective, explaining new firm formation at the regional level from (regional) unemployment rates. By following such a perspective, an increase in self-employment may reflect an environment that encourages risk-taking and job creation, or it may be an indicator of a lack of jobs in case wages are set above market-clearing level (Earle and Sakova 2000). That is, a positive relationship between unemployment and subsequent net entry of firms may reflect a positive impact on entry or a negative effect on exit. The former explanation suggests ample entrepreneurial opportunities and a dynamic labour market. On the other hand, the latter explanation suggests a lack of job alternatives and the presence of many unprofitable firms. In the present study we investigate what is the most appropriate interpretation for different industries in Italian regions.

We examine the issue of regional variation in firm birth rates in Italy with new data covering all 103 Italian provinces for the period 1997–2003. Italy has a considerable variability in unemployment rates: the Northern autonomous province

[1] For an overview of the different factors influencing new firm formation at both the individual and aggregate level, see Lee et al. (2004) and Carree (2006).

of Bolzano has the lowest unemployment rate among EU regions (2.0% in 2003), while the Southern region of Calabria has one of the highest unemployment rates in the European Union (23.4% in 2003). Several tens of thousands of firms enter (and exit) annually in Italy in the six sectors under study. The sector commerce (retailing, wholesaling and repair) has the highest number of entries and exits, with around 85,000 entries and 90,000 exits per year (source: Unioncamere 2002). The construction sector shows the highest net entry (entry minus exit) in Italy: about 15,000 annually (source: Unioncamere 2002). In this study we will investigate the role of labor market conditions, and more specifically unemployment, in determining this regional variation.

This article is structured as follows. The next section presents a survey of the literature on the relationship between unemployment and entrepreneurship. Section three contains an overview of the firm entry and exit rates and unemployment rates within Italian provinces. In section four we present our model explaining the impact of unemployment on firm entry and exit across provinces. Section five presents the estimation results and section six concludes.

Unemployment and firm formation

The debate on the links between unemployment and new firm formation can be traced back to Knight (1921), stressing that at any time individuals have to make a decision about how to allocate their time and abilities among three different type of activities, including unemployment, self-employment and wage-employment. According to Knight, it is the relative price of these activities that ultimately determines an individual's decision. Because unemployment is usually considered unattractive, a positive relationship between unemployment and subsequent self-employment is to be expected. This link between unemployment and a 'defensive' type of entrepreneurship was later refined by Oxenfeldt (1943), building an occupational choice framework based on the assumption that individuals who have a higher probability of becoming unemployed or with low prospects for wage-employment, tend to become self-employed.

The relationship between unemployment and self-employment is, however, more complex than suggested above (Audretsch et al. 2005). Unemployment may have a positive or negative effect on self-employment, and vice versa. First, unemployed individuals may be more likely to start their own business as opportunity costs of self-employment are low (Evans and Leighton 1990). This is the traditional 'unemployment push' effect. Second, a high rate of (regional) unemployment may be associated with a low level of entrepreneurship as unemployment is an indication of a depressed economy in which there is low aggregate demand and, accordingly, a limited amount of business opportunities. Third, there is the effect of higher levels of self-employment leading to a decrease in unemployment. Not only do new entrepreneurs provide themselves with a job, they also hire employees (previously unemployed workers) (Storey 1991). Indeed, Campbell (1996) argues that a high level of unemployment also stimulates employment creation as it is cheaper to hire new workers. Hence, on the one hand, unemployment rates may stimulate the rate of self-employment, whereas on the other hand, higher entrepreneurial activity

rates may reduce unemployment in subsequent periods.[2] Fourth, increased entrepreneurial activity may also result in higher unemployment. The Schumpeterian mechanism of creative destruction is likely to lead to increased unemployment through innovation (Aghion and Bolton 1997). Fritsch and Mueller (2004) claim that in the short run the process of creative destruction and higher competition—brought about by higher new firm entry—leads to an increased number of firm exits (and higher unemployment). However, they also argue that in the longer run it may be expected that there will be employment gains as a result of increased entry.

There is a substantial body of empirical literature on regional variation in unemployment and firm birth rates (entrepreneurship). Most studies were published in the 1980s and 1990s, but this line of investigation has witnessed a resurgence of interest in recent years, shaping the policy debate on chronic unemployment in Europe and certain OECD countries (Thurik 2003). The studies used different indicators, were carried out for different sectors, different countries and different geographical units of analysis. In general, they found significant regional variation in new firm formation, and identified a set of regional determinants to explain this variation. Unemployment was among the explanatory variables that were frequently identified as important. The studies comparing new firm births across regions either follow an ecological or industrial organisation approach (i.e., start-up activity is measured vis-à-vis the population of firms) or the labor market approach (i.e., the number of new firms is measured relative to the size of the labor force; Armington and Acs 2002).

The empirical evidence on the relationship between unemployment and firm entry has been mixed. Storey (1991) argues that time-series studies tend to find evidence for a positive relationship, whereas cross-sectional studies tend to support a negative relationship.[3] Several cross-sectional (i.e., regional) studies have found a negative effect of unemployment upon firm births, including Audretsch and Fritsch (1994), Guesnier (1994), Garofoli (1994), Davidsson et al. (1994), Reynolds et al. (1995), Fritsch and Falck (2003) and Sutaria and Hicks (2004). Other studies find evidence for a positive (push) effect of unemployment. Audretsch and Fritsch (1999) show that the negative effect of unemployment disappears when including industrial organization aspects in the analysis. They find a positive effect only for small-scale industries with low barriers to entry. Campbell (1996) finds a positive effect on firm entry, which is larger in industries producing output that is traded across state borders than in industries producing non-traded output. Tambunan (1992, 1994) finds evidence for the 'push' hypothesis for Indonesia. Investigating firm birth rates in the United States, Lee et al. (2004) find that the unemployment rate has a positive influence on firm births (albeit at the 10 percent level of significance). Carree (2002) finds little or no evidence for the unemployment push hypothesis, maybe except for

[2] Using panel data of 23 OECD countries for the period 1974-2002, Audretsch et al. (2005) investigate these two effects empirically. Their results confirm the existence of the two distinct relationships between unemployment and self-employment rates.

[3] See also Foti and Vivarelli (1994, p. 83). Audretsch and Jin (1994) claim to reconcile these seemingly contradicting relationships by taking into account industry and economy-wide shocks in the model of entrepreneurial choice.

low-entry industries, such as second-hand merchandise stores and automotive repair shops. Ritsilä and Tervo (2002) fail to find an effect of unemployment on new firm formation at the regional level, but do find evidence for a positive effect of unemployment at the individual level and a negative (business cycle) effect at the country level. Finally, Arauzo-Carod and Teruel-Carrizosa (2005) find a positive effect of unemployment on firm entry in Spanish municipalities.

Empirical findings on the relationship between unemployment and self-employment may be dependent upon whether certain variables are in- or excluded in the analysis as well as upon the choice of measurement instruments. In addition, Acs (2006) argues that higher unemployment may deter start-ups in some sectors and increase them in others, therefore making less straightforward and somewhat inconclusive the entrepreneurship/unemployment relationship at the aggregate level. Carree (2006) notes two reasons for the lack of empirical evidence for the unemployment push hypothesis. First, it may be difficult to capture the (possible) negative depressed economy effects of unemployment by including business cycle variables in the model. Second, unemployed people may be less well-endowed in terms of human or entrepreneurial capital than employed people, inhibiting business start-up by the unemployed. Indeed, Acs and Armington (2004) find that rates of new firm formation are higher in regions with a high proportions of adult workers with a college degree.

Empirical studies investigating the relationship between unemployment and self-employment have used different measures of unemployment and new firm formation. New firm formation has been measured in terms of both gross entry and net entry rates (Carree and Thurik 1996). Unemployment is not only expected to influence entry but also exit, for example by producing higher mortality rates. Buzzelli (2005) & Love (1996) find a positive effect of unemployment on exit rates. Carree and Thurik (1996) find that growing levels of unemployment are providing an incentive to enter and a disincentive to exit the Dutch retailing industries. Buzzelli (2005) argues that given its importance for innovation, job creation and economic development, research has paid far more attention to entry than to exit.

The present study distinguishes itself from existing research by investigating and comparing effects of unemployment on gross entry, gross exit and net entry rates. The main hypothesis of the paper is that unemployment has a positive effect on entry and a negative effect on exit. The positive effect on (net) entry is expected to be stronger for sectors with relatively low (capital) investments. It is easier to start a new venture in such sectors with low barriers to entry compared to sectors in which starting a firm is more difficult.

Data on Italian provinces

Our data are retrieved from Unioncamere and include unemployment, entry and exit rates for the 103 Italian provinces. Table 1 presents the ten provinces that score highest and lowest in terms of unemployment, firm entry and firm exit. The unemployment rate is calculated as the average rate for the period 1996 to 2002, while the entry and exit rates are calculated as averages over the period 1997 to 2003. We see that unemployment is highest in the south of Italy, including provinces

Table 1 Provincial unemployment and entry and exit rates (average yearly rates)

Province	Unemployment rate (average)	Province	Entry rate (average)	Province	Exit rate (average)
Lecco	2.20	Messina	5.41	Messina	4.10
Bolzano-Bozen	2.23	Biella	6.19	Palermo	4.37
Vicenza	2.84	Bolzano-Bozen	6.33	Regio Calabria	4.39
Bergamo	2.93	Roma	6.38	Roma	4.46
Reggio Emilia	3.00	Lodi	6.52	Catania	4.74
Mantova	3.15	Sondrio	6.54	Nuoro	4.75
Treviso	3.16	Milano	6.63	Napoli	4.80
Modena	3.31	Enna	6.64	Bolzano-Bozen	5.01
Cremona	3.34	Belluno	6.70	Potenza	5.08
Belluno	3.49	Ascoli Piceno	6.79	Ragusa	5.12
Cagliari	23.12	Lecce	8.42	Bologna	6.94
Cosenza	23.99	Pescara	8.45	Reggio Emilia	6.95
Catania	24.28	Campobasso	8.54	La Spezia	6.96
Caserta	25.59	Rovigo	8.57	Torino	7.00
Messina	25.79	Prato	8.60	Ferrara	7.04
Catanzaro	26.20	Vibo Valentia	8.60	Livorno	7.07
Palermo	26.63	Caserta	8.75	Udine	7.08
Napoli	26.94	Rimini	8.79	Rimini	7.09
Reggio Calabria	28.58	Livorno	8.84	Savona	7.46
Enna	28.86	Reggio Emilia	9.64	Prato	7.96

The ten provinces with the lowest unemployment, entry and exit rates are presented in the upper part of the table, while the ten provinces with the highest rates are presented in the lower part. Averages are for 1996–2002 for unemployment and for 1997–2003 for entry and exit rates

in the regions Calabria (e.g., Catanzaro, Reggio Calabria, Cosenza), Campania (e.g., Napoli, Caserta), Sicilia (e.g., Palermo, Enna, Messina, Catania) and Sardegna (e.g., Cagliari).[4] Provinces with the lowest unemployment rates are located in Northern and Central Italy, mainly in Lombardia (e.g., Lecco, Bergamo, Mantova, Cremona), Trentino (e.g., Bolzano-Bozen), Veneto (e.g., Vicenza, Treviso, Belluno) and Emilia Romagna (e.g., Reggio Emilia, Modena).

For the entry and exit rates it is more difficult to find a common pattern across provinces. There are several provinces with high entry rates that are characterized by a low value added per capita (e.g., Vibo Valentia, Lecce), but there are also provinces combining a relatively low value added per capita with low firm entry rates (e.g., Enna, Messina). In addition, we see that the provinces of the major cities Roma and Milano are characterized by relatively low entry rates. In terms of exit rates we see that the provinces with a relatively low value added per capita are also characterized by low exit rates. Again apart from the provinces of the cities of Milano and Roma, many of these 'low-exit' provinces are located in the less densely populated areas in Southern Italy. Several 'high-entry' provinces—such as Reggio Emilia, Prato, Rimini and Livorno—are also characterized by high firm exit rates. The provinces of the cities of Roma and Milano and also Bolzano-Bozen are characterized by relatively low firm entry and exit rates.

[4] Note that in the Southern regions the so-called shadow economy is much larger than in other parts of the country (ISTAT 2005).

The model

In this section we introduce our model, also discussing summary statistics for the endogenous and exogenous variables. We use the following notation. The index i represents province (i=1, ..., 103) and the index t stands for year (t=1997, ..., 2003). Total labor force, the sum of employed and unemployed, is represented by L_{it}, while the symbol for the provincial number of unemployed is U_{it}. We use symbols E_{it} and X_{it} for number of entrants and number of firms exiting. Hence, the unemployment rate u_{it} equals the ratio U_{it}/L_{it}. The entry and exit rate of firms can be measured in either labor terms, assuming that one firm represents one person as self-employed or in terms of number of firms. In this paper we choose the rates to be relative to total labor force, i.e. entry and exit rates are $e_{it} = E_{it}/L_{i,t-1}$ and $x_{it} = X_{it}/L_{i,t-1}$.[5]

In our model, we assume that new firms are set up by either employed or unemployed individuals. The main question is whether in regions with high unemployment there is more (net) entry and less exit of firms than in regions with lower unemployment. The model to test for this is (with Z_{it} containing other explanatory variables):

$$E_{it} = a_t L_{i,t-1} + bU_{i,t-1} + cZ_{it} + \varepsilon_{it}^{E} \tag{1}$$

$$X_{it} = d_t L_{i,t-1} + eU_{i,t-1} + fZ_{it} + \varepsilon_{it}^{X} \tag{2}$$

$$E_{it} - X_{it} = g_t L_{i,t-1} + hU_{i,t-1} + jZ_{it} + \varepsilon_{it}^{N} \tag{3}$$

The first determinant in Eq. 1 is the total labour force in the previous year. For each person in the labor force, (self-)employed or unemployed, there is a probability a_t that (s)he starts an enterprise. This probability is made time-dependent since there has been a relaxation of entry regulation in Italy over the years under consideration. The second determinant is the number of unemployed. There is an additional probability b for the unemployed to start a firm (note that this can also be negative). Hence, the hypothesis that unemployment has a positive (push) effect on entry is simply whether $b>0$. Similar interpretations can be given for the exit equation 2 and net entry equation 3. The parameter e (in case negative) represents the effect of unemployment preventing self-employed to terminate their business, because of lack of job alternatives. The parameter h is simply the difference between the parameters b and e.

Equations 1–3 can be estimated in absolute numbers, but also in relative terms. A disadvantage of using the absolute numbers is that the large provinces in terms of

[5] We have also examined the results when taking the rates relative to the number of incumbent firms (in the previous period). These results were very close to those of entry and exit rates relative to total labor force.

Table 2 Summary statistics for six sectors

	Manuf	Constr	Commerce	HotRest	Transp	Finance
E	338.71 (333.40)	502.13 (481.37)	835.01 (967.76)	146.37 (132.15)	101.07 (137.78)	97.38 (112.08)
X	385.79 (415.36)	365.85 (365.41)	891.63 (982.28)	153.52 (141.21)	122.88 (159.15)	70.00 (87.24)
E-X	−47.08 (154.94)	136.28 (171.66)	−56.62 (310.65)	−7.15 (67.31)	−21.81 (46.74)	27.39 (49.27)
e	1.59 (0.80)	2.41 (0.90)	3.75 (1.23)	0.75 (0.43)	0.43 (0.21)	0.45 (0.19)
x	1.77 (0.94)	1.74 (0.58)	4.07 (1.19)	0.79 (0.46)	0.54 (0.21)	0.32 (0.14)
e-x	−0.18 (0.45)	0.67 (0.56)	−0.32 (0.88)	−0.04 (0.27)	−0.11 (0.16)	0.13 (0.16)
U	Absolute: 24.52 (38.08)			Relative: 0.10 (0.08)		
Patents	Absolute: 368.11 (1195.36)			Relative: 0.95 (1.39)		
Growth	Absolute: 10.34 (13.39)			Relative: 0.05 (0.02)		
Tourists	Absolute: 795.93 (1164.43)			Relative: 3.73 (3.91)		
City	Absolute: 51.68 (264.70)			Relative: 0.04 (0.19)		
vapc	Absolute: 4087.41 (5939.12)			Relative: 16.86 (4.29)		
inddist	Absolute: 46.70 (106.76)			Relative: 0.21 (0.41)		

Means are presented with standard deviations between parentheses. Average values are presented for a 7-year period

population (like Milano and Roma) may dominate the regression outcomes. In case of dividing all variables by the labor force in the previous year ($L_{i,t-1}$), we have:

$$e_{it} = a_t + bu_{i,t-1} + cZ_{it}/L_{i,t-1} + \varepsilon_{it}^{E} \tag{1a}$$

$$x_{it} = d_t + eu_{i,t-1} + fZ_{it}/L_{i,t-1} + \varepsilon_{it}^{X} \tag{2a}$$

$$e_{it} - x_{it} = g_t + hu_{i,t-1} + jZ_{it}/L_{i,t-1} + \varepsilon_{it}^{N} \tag{3a}$$

The choice of additional variables Z_{it} is important. For example, one needs to consider whether or not to incorporate a variable measuring the economic welfare of a province. It is well-known that rich provinces are characterized by low unemployment rates and that poorer provinces have much higher unemployment rates. Hence, by not including a variable measuring economic welfare, effects may be erroneously assigned to the unemployment variable. The additional explanatory variables included in the Z_{it}-variable are the following: (1) *patents*, which is an indication of the extent to which a province is characterized by high-tech industry. It is measured by the number of patents (brevetti) in 2003 per 1,000 firms (source: Unioncamere 2002); (2) *growth*, measured by the relative change in the provincial value added (valore aggiunto a prezzi base—al netto SIFIM, source: ISTAT) in the previous period; (3) *tourists*, which is an indicator of the extent to which the provincial economy benefits from tourism (high in e.g. Firenze and Venezia; source: ISTAT); (4) *city*, a dummy variable with value 1 for the four largest cities in terms of resident population (Torino, Milano, Napoli and Roma), 0 otherwise; (5) value added per capita, abbreviated as *vapc*, based upon the provincial value added data; (6) the presence of industrial districts, measured as a dummy variable, *inddist*, with

Table 3 Estimation results for *entry* model (1), *absolute* numbers

	Manuf	Constr	Commerce	HotRest	Transp	Finance
a1997	2.647*	3.897*	6.965*	1.704*	0.759*	0.714*
	(0.236)	(0.292)	(0.359)	(0.108)	(0.068)	(0.044)
a1998	2.814*	4.042*	6.894*	1.714*	0.641*	0.674*
	(0.239)	(0.295)	(0.363)	(0.110)	(0.069)	(0.044)
a1999	2.832*	4.272*	7.469*	1.710*	0.636*	0.720*
	(0.248)	0.307)	(0.377)	(0.114)	(0.071)	(0.046)
a2000	2.775*	4.235*	8.106*	1.657*	0.641*	0.751*
	(0.250)	(0.309)	(0.380)	(0.115)	(0.072)	(0.047)
a2001	2.795*	4.394*	8.344*	1.688*	0.654*	0.748*
	(0.260)	(0.322)	(0.395)	(0.119)	(0.075)	(0.048)
a2002	2.716*	4.363*	8.615*	1.755*	0.633*	0.638*
	(0.267)	(0.329)	(0.404)	(0.122)	(0.077)	(0.050)
a2003	2.746*	4.376*	8.556*	1.776*	0.636*	0.552*
	(0.266)	(0.328)	(0.404)	(0.122)	(0.077)	(0.049)
b	−2.222*	−6.529*	−0.970	−2.391*	−0.796*	−0.923*
	(0.614)	(0.758)	(0.932)	(0.281)	(0.177)	(0.114)
Patents	0.125*	0.079*	0.233*	0.046*	0.049*	−0.001
	(0.014)	(0.017)	(0.021)	(0.006)	(0.004)	(0.003)
Growth	2.420*	−0.865	0.808	0.045	−0.073	0.105
	(1.040)	(1.284)	(1.579)	(0.477)	(0.299)	(0.193)
Tourists	−0.004	−0.036*	0.032*	0.031*	0.012*	−0.001
	(0.007)	(0.009)	(0.011)	(0.003)	(0.002)	(0.001)
City	−0.274*	−0.408*	0.695*	0.019	0.038*	0.045*
	(0.056)	(0.069)	(0.084)	(0.026)	(0.016)	(0.010)
IndDist	0.368*	−0.047	0.086	−0.017	−0.008	0.005
	(0.060)	(0.074)	(0.092)	(0.028)	(0.017)	(0.011)
VACap	−0.076*	−0.069*	−0.267*	−0.057*	−0.014*	−0.009*
	(0.012)	(0.014)	(0.018)	(0.005)	(0.003)	(0.002)
Adj. R^2	0.814	0.864	0.949	0.751	0.910	0.943
Mean dep.	338.7	502.1	835.0	146.4	101.1	97.4

Standard errors are between parentheses. The number of observations amounts to 721.
*Refers to a significance level of 5%

value 1 for provinces that have at least one industrial district (source: Unioncamere 2002), 0 otherwise. There are 22 provinces with *inddist* equal to 1.[6] All variables except for *tourists* (which is already an absolute number) are multiplied by provincial labor force.

Table 2 presents means and standard deviations for the dependent and independent variables per sector, i.e., manufacturing (*Manuf*), construction (*Constr*), commerce (*Commerce*), hotels and restaurants (*HotRest*), transport (*Transp*) and financial intermediation (*Finance*), respectively.[7] The sector *Commerce* includes retailing,

[6] Provinces with at least one "important" (according to the definition used by Unioncamere) industrial district include: Ascoli Piceno (shoes), Arezzo (golden jewelry), Avellino (leather), Bari (footwear), Biella (textiles—wool), Brescia (metal household artifacts and machinery for textile industry), Como (silk), Ferrara (mechanical engineering), Macerata (leather products), Mantova (stockings), Modena (knitwear and biomedical industry and ceramics), Pisa (leather), Pordenone (cutlery), Prato (textiles), Parma (ham), Pesaro-Urbino (furniture), Pavia (machinery for the footwear industry), Siena (furniture), Treviso (sporting footwear), Vicenza (leather), Verona (furniture) and Viterbo (ceramics).

[7] They are coded as sectors D, F, G, H, I and J in the Unioncamere—Movimprese databases.

wholesale and repair activities. The sector *Transp* includes transport, storage and communication, but is dominated by transport activities. For this study we excluded other sectors from the Unioncamere data set, such as agriculture—because the data in the first years were not reliable—and several other sectors for which there were few observations or that were very heterogeneous in terms of activities.

In accordance with the formulation of equations including absolute and relative numbers, all variables are measured and presented both in absolute and relative terms. E, X, and E-X refer to *absolute* entry, exit and net entry, respectively (as defined in Eqs. 1 to 3, whereas e, e-x, and e-x refer to relative entry, exit and net entry rates, respectively (as defined in Eqs. 1a to 3a). For example, in manufacturing the average number of entrants is 338.71 per province, while the average number per 1,000 in the labor force is equal to 1.59. The strong increase in the number of firms in the construction sector from the second half of the 1990s onwards is due to a huge increase in the demand for construction services, mostly as a direct consequence of the introduction of subsidies for repair and restoration of buildings. This has, in turn, forced a number of construction firms to transfer from the hidden (shadow) economy to the official economy.

Table 4 Estimation results for *exit* model (2), *absolute* numbers

	Manuf	Constr	Commerce	HotRest	Transp	Finance
a1997	2.822*	2.999*	7.930*	1.494*	0.839*	0.402*
	(0.239)	(0.177)	(0.333)	(0.094)	(0.062)	(0.031)
a1998	2.531*	2.660*	7.388*	1.412*	0.724*	0.372*
	(0.242)	(0.179)	(0.337)	(0.095)	(0.062)	(0.031)
a1999	2.407*	2.627*	7.698*	1.454*	0.688*	0.377*
	(0.252)	(0.186)	(0.350)	(0.098)	(0.065)	(0.033)
a2000	2.395*	2.651*	7.777*	1.417*	0.700*	0.376*
	(0.253)	(0.187)	(0.352)	(0.099)	(0.065)	(0.033)
a2001	2.508*	2.911*	8.243*	1.503*	0.711*	0.432*
	(0.264)	(0.195)	(0.367)	(0.103)	(0.068)	(0.034)
a2002	2.595*	2.960*	8.433*	1.526*	0.675*	0.482*
	(0.270)	(0.200)	(0.375)	(0.106)	(0.069)	(0.035)
a2003	2.421*	2.802*	8.083*	1.455*	0.621*	0.426*
	(0.269)	(0.199)	(0.375)	(0.105)	(0.069)	(0.035)
e	−2.097*	−3.581*	−6.270*	−2.849*	−0.915*	−0.609*
	(0.621)	(0.460)	(0.864)	(0.243)	(0.160)	(0.081)
Patents	0.130*	0.029*	0.189*	0.022*	0.042*	0.016*
	(0.014)	(0.011)	(0.020)	(0.006)	(0.004)	(0.002)
Growth	−0.626	−1.840*	−2.340	−0.978*	−0.240*	−0.255
	(1.053)	(0.779)	(1.464)	(0.412)	(0.271)	(0.136)
Tourists	−0.005	−0.021*	0.030*	0.035*	0.012*	0.000
	(0.007)	(0.006)	(0.010)	(0.003)	(0.002)	(0.001)
City	−0.298*	−0.215*	0.452*	−0.023	0.017	0.006
	(0.056)	(0.042)	(0.078)	(0.022)	(0.014)	(0.007)
IndDist	0.384*	−0.121*	−0.122	−0.013	−0.023	0.004
	(0.061)	(0.045)	(0.085)	(0.024)	(0.016)	(0.008)
VACap	−0.044*	−0.036*	−0.207*	−0.035*	−0.009*	−0.003*
	(0.012)	(0.009)	(0.016)	(0.005)	(0.003)	(0.002)
Adj. R^2	0.877	0.913	0.958	0.837	0.945	0.953
Mean dep.	385.8	365.8	891.6	153.5	122.9	70.0

Standard errors are between parentheses. The number of observations amounts to 721.
*Refers to a significance level of 5%

Note that the statistics in the lower part of the table (unemployment [*U*], patents, growth, tourists, city, vapc and inddist) are identical across industries. From Table 2 we see that (net) entry and (net) exit rates differ across industries. Firm entry is highest in commerce, but is also relatively high in construction and manufacturing. These sectors are also characterized by the highest exit rates, that is, industry dynamics or turbulence is highest in these sectors. Net entry is positive only for construction and financial intermediation, the other sectors are characterized by net exit of which commerce has the highest net exit rate.

Empirical results

The empirical results are presented in Tables 3, 4, 5, 6, 7 and 8. These tables refer to the Eqs. 1, 2 and 3 for the absolute numbers and Eqs. 1a, 2a and 3a for the relative numbers, respectively. We will first discuss the main result from these tables: the effect of unemployment on entry (*b*), exit (*e*) and net entry (*h*). For entry we see

Table 5 Estimation results for *net entry* model (3), *absolute* numbers

	Manuf	Constr	Commerce	HotRest	Transp	Finance
a1997	−0.175	0.897*	−0.964*	0.210*	−0.081	0.311*
	(0.166)	(0.191)	(0.317)	(0.082)	(0.066)	(0.038)
a1998	0.283	1.382*	−0.494	0.301*	−0.083	0.303*
	(0.168)	(0.193)	(0.321)	(0.083)	(0.066)	(0.038)
a1999	0.425*	1.646*	−0.229	0.255*	−0.051	0.343*
	(0.175)	(0.201)	(0.333)	(0.086)	(0.069)	(0.040)
a2000	0.380*	1.584*	0.329	0.240*	−0.060	0.374*
	(0.176)	(0.202)	(0.336)	(0.087)	(0.069)	(0.040)
a2001	0.287	1.483*	0.101	0.185*	−0.056	0.316*
	(0.183)	(0.210)	(0.350)	(0.090)	(0.072)	(0.042)
a2002	0.121	1.404*	0.181	0.229*	−0.042	0.156*
	(0.187)	(0.215)	(0.358)	(0.092)	(0.074)	(0.043)
a2003	0.325	1.573*	0.473	0.321*	0.015	0.126*
	(0.187)	(0.215)	(0.357)	(0.092)	(0.074)	(0.042)
h	−0.125	−2.948*	5.299*	0.458*	0.119	−0.314*
	(0.432)	(0.496)	(0.824)	(0.212)	(0.170)	(0.098)
Patents	−0.005	0.050*	0.044*	0.024*	0.007	−0.017*
	(0.010)	(0.011)	(0.019)	(0.005)	(0.004)	(0.002)
Growth	3.046*	0.975	3.149*	1.024*	0.167	0.360*
	(0.732)	(0.840)	(1.396)	(0.360)	(0.289)	(0.166)
Tourists	0.001	−0.015*	0.001	−0.004	0.001	−0.001
	(0.005)	(0.006)	(0.010)	(0.003)	(0.002)	(0.001)
City	0.024	−0.194*	0.242*	0.042*	0.022	0.039*
	(0.039)	(0.045)	(0.075)	(0.019)	(0.015)	(0.009)
IndDist	−0.015	0.074	0.208*	−0.004	0.015	0.001
	(0.042)	(0.049)	(0.081)	(0.021)	(0.017)	(0.010)
VACap	−0.032*	−0.033*	−0.059*	−0.023*	−0.005	−0.006*
	(0.008)	(0.009)	(0.016)	(0.004)	(0.003)	(0.002)
Adj. R^2	0.574	0.543	0.614	0.455	0.271	0.783
Mean dep.	−47.1	136.3	−56.6	−7.2	−21.8	27.4

Standard errors are between parentheses. The number of observations amounts to 721.
*Refers to a significance level of 5 percent

Table 6 Estimation results for *entry* model (1a), *relative* numbers

	Manuf	Constr	Commerce	HotRest	Transp	Finance
a1997	1.253*	1.520*	5.126*	1.036*	0.214*	0.424*
	(0.308)	(0.315)	(0.478)	(0.158)	(0.073)	(0.068)
a1998	1.306*	1.517*	4.986*	1.017*	0.162*	0.417*
	(0.311)	(0.318)	(0.482)	(0.160)	(0.074)	(0.069)
a1999	1.113*	1.528*	5.199*	0.900*	0.124	0.457*
	(0.320)	(0.328)	(0.496)	(0.164)	(0.076)	(0.071)
a2000	0.959*	1.495*	5.764*	0.784*	0.119	0.509*
	(0.325)	(0.333)	(0.504)	(0.167)	(0.077)	(0.072)
a2001	0.965*	1.499*	5.700*	0.792*	0.092	0.469*
	(0.334)	(0.342)	(0.518)	(0.171)	(0.079)	(0.074)
a2002	0.837*	1.610*	5.722*	0.859*	0.038	0.329*
	(0.340)	(0.349)	(0.528)	(0.175)	(0.081)	(0.075)
a2003	0.654	1.436*	5.569*	0.821*	−0.007	0.227*
	(0.347)	(0.355)	(0.538)	(0.178)	(0.082)	(0.077)
b	−0.590	−2.890*	0.508	−1.114*	−0.296	−0.661*
	(0.752)	(0.770)	(1.167)	(0.386)	(0.179)	(0.166)
Patents	−0.024	−0.093*	0.065	−0.004	0.015*	−0.010
	(0.026)	(0.026)	(0.040)	(0.013)	(0.006)	(0.006)
Growth	0.938	−1.139	2.745	−0.014	0.068	0.230
	(1.261)	(1.292)	(1.958)	(0.648)	(0.299)	(0.279)
Tourists	−0.036*	−0.029*	0.013	0.040*	0.000	−0.003
	(0.008)	(0.008)	(0.012)	(0.004)	(0.002)	(0.002)
City	−0.385*	−0.663*	0.480	−0.145	−0.030	−0.005
	(0.161)	(0.165)	(0.250)	(0.083)	(0.038)	(0.036)
IndDist	0.461*	0.032	0.030	−0.050	−0.028	0.019
	(0.072)	(0.074)	(0.112)	(0.037)	(0.017)	(0.016)
VACap	0.040*	0.087*	−0.119*	−0.009	0.021*	0.007
	(0.016)	(0.016)	(0.025)	(0.008)	(0.004)	(0.004)
Adj. R^2	0.177	0.309	0.152	0.228	0.312	0.285
Mean dep.	1.588	2.411	3.750	0.753	0.432	0.445

Standard errors are between parentheses. The number of observations amounts to 721.
*Refers to a significance level of 5 percent

from Tables 3 and 6 that all effects are negative, except for Eq. 1a for the sector commerce. Hence, there appears not to be support for the 'unemployment push' hypothesis. The sector commerce may be the only sector in which unemployed are more likely than employed to start a new firm, but the effect is not significant. For exit we find from Tables 4 and 7 that in all sectors there is a negative effect, and that the effect is almost always significant. This suggests that self-employed do not wish to exit in provinces that have high unemployment rates since there are no job alternatives. For example, they keep on working in their shops (commerce has the strongest negative effect) or restaurants. The net effect can be found in Tables 5 and 8. In the sector commerce there is a clear positive effect. However, this is not due to unemployed workers starting new firms, but rather to firm owners not exiting in provinces with high unemployment. Hence, this suggests no flourishing entrepreneurial culture but rather presents a more pessimistic picture of lack of job alternatives. The largest difference between the effect of unemployment on net entry is between construction on the one hand, and commerce on the other. These are also the two sectors which differ most in terms of development of number of firms (see Table 2). Apparently, the growing construction sector is attractive for many

Table 7 Estimation results for *exit* model (2a), *relative* numbers

	Manuf	Constr	Commerce	HotRest	Transp	Finance
a1997	1.206*	1.755*	5.815*	0.911*	0.467*	0.240*
	(0.354)	(0.227)	(0.498)	(0.155)	(0.083)	(0.048)
a1998	0.928*	1.445*	5.427*	0.816*	0.387*	0.218*
	(0.358)	(0.229)	(0.503)	(0.157)	(0.084)	(0.049)
a1999	0.773*	1.370*	5.543*	0.810*	0.339*	0.216*
	(0.368)	(0.235)	(0.518)	(0.162)	(0.087)	(0.050)
a2000	0.658	1.392*	5.576*	0.792*	0.386*	0.226*
	(0.374)	(0.239)	(0.526)	(0.164)	(0.088)	(0.051)
a2001	0.557	1.500*	5.449*	0.740*	0.319*	0.250*
	(0.384)	(0.246)	(0.540)	(0.169)	(0.090)	(0.052)
a2002	0.628	1.562*	5.629*	0.778*	0.292*	0.297*
	(0.392)	(0.250)	(0.551)	(0.172)	(0.092)	(0.053)
a2003	0.469	1.458*	5.377*	0.721*	0.246*	0.253*
	(0.399)	(0.255)	(0.561)	(0.175)	(0.094)	(0.054)
e	−0.708	−1.414*	−2.796*	−1.536*	−0.260	−0.523*
	(0.865)	(0.553)	(1.217)	(0.380)	(0.204)	(0.118)
Patents	−0.043	−0.043*	0.064	−0.007	0.027*	−0.002
	(0.030)	(0.019)	(0.042)	(0.013)	(0.007)	(0.004)
Growth	0.493	−1.206	0.057	−0.511	0.233	−0.184
	(1.451)	(0.928)	(2.041)	(0.637)	(0.341)	(0.198)
Tourists	−0.035*	−0.014*	0.019	0.054*	0.004	−0.001
	(0.009)	(0.006)	(0.013)	(0.004)	(0.002)	(0.001)
City	−0.331	−0.355*	0.116	−0.192*	−0.063	−0.014
	(0.185)	(0.118)	(0.261)	(0.081)	(0.044)	(0.025)
IndDist	0.530*	−0.056	−0.141	−0.080*	−0.026	−0.000
	(0.083)	(0.053)	(0.117)	(0.036)	(0.020)	(0.011)
VACap	0.068*	0.033*	−0.077*	0.001	0.011*	0.008*
	(0.018)	(0.012)	(0.026)	(0.008)	(0.004)	(0.002)
Adj. R^2	0.198	0.147	0.024	0.354	0.200	0.314
Mean dep.	1.765	1.739	4.070	0.794	0.544	0.316

Standard errors are between parentheses. The number of observations amounts to 721.
*Refers to a significance level of 5%

employed workers or also immigrants and the declining sector of commerce contains the bulk of self-employed who do not wish to exit in case of lack of job alternatives.

The results on the parameters *a1997* up till *a2003* confirm the relaxation of entry regulations only for the commercial sector. However, since this is the largest sector, there will be an effect of the deregulation on the total number of firms. For the regional controls of *Patents* and *VACap* there is a clear difference between Tables 3, 4 and 5 showing absolute numbers and Tables 6, 7 and 8 showing results for relative numbers. These two variables of regional development level are negatively correlated with the unemployment variable. However, the effects of unemployment are robust against using either absolute or relative numbers. The effect of *Growth* is positive, as expected, for net entry for most sectors. The effect of *Tourists* is strongest both for entry and for exit in the sectors commerce and hotels and restaurants, also as expected. Both entry and exit are higher in the four major cities (effect *City* dummy) in commerce while they are both lower in manufacturing and construction. Industrial districts (*IndDist*) are important as determinant for entry and exit almost exclusively for manufacturing. This finding is an obvious one: industrial districts are networks of manufacturing firms. It confirms Mueller's (2006) result

Table 8 Estimation results for *net entry* model (3a), *relative* numbers

	Manuf	Constr	Commerce	HotRest	Transp	Finance
a1997	0.047	−0.236	−0.689*	0.125	−0.253*	0.183*
	(0.175)	(0.195)	(0.309)	(0.103)	(0.065)	(0.050)
a1998	0.378*	0.072	−0.441	0.201	−0.225*	0.198*
	(0.177)	(0.197)	(0.312)	(0.104)	(0.066)	(0.051)
a1999	0.340	0.158	−0.344	0.090	−0.214*	0.240*
	(0.182)	(0.202)	(0.321)	(0.107)	(0.068)	(0.052)
a2000	0.301	0.103	0.189	−0.008	−0.267*	0.284*
	(0.185)	(0.206)	(0.326)	(0.109)	(0.069)	(0.053)
a2001	0.408*	−0.001	0.251	0.052	−0.227*	0.219*
	(0.190)	(0.211)	(0.336)	(0.112)	(0.071)	(0.055)
a2002	0.209	0.047	0.093	0.081	−0.254*	0.032
	(0.194)	(0.215)	(0.342)	(0.114)	(0.072)	(0.056)
a2003	0.184	−0.021	0.192	0.101	−0.253*	−0.026
	(0.197)	(0.219)	(0.348)	(0.116)	(0.074)	(0.057)
h	0.118	−1.476*	3.304*	0.423	−0.037	−0.137
	(0.427)	(0.476)	(0.756)	(0.253)	(0.160)	(0.123)
Patents	0.018	−0.050*	0.001	0.003	−0.012*	−0.009*
	(0.015)	(0.016)	(0.026)	(0.009)	(0.005)	(0.004)
Growth	0.445	0.067	2.688*	0.497	−0.165	0.414*
	(0.717)	(0.798)	(1.268)	(0.424)	(0.268)	(0.206)
Tourists	−0.001	−0.015*	−0.007	−0.013*	−0.003*	−0.001
	(0.005)	(0.005)	(0.008)	(0.003)	(0.002)	(0.001)
City	−0.054	−0.308*	0.364*	0.047	0.033	0.009
	(0.092)	(0.102)	(0.162)	(0.054)	(0.034)	(0.026)
IndDist	−0.070	0.088	0.172*	0.030	−0.002	0.019
	(0.041)	(0.046)	(0.073)	(0.024)	(0.015)	(0.012)
VACap	−0.028*	0.054*	−0.042*	−0.009	0.010*	−0.002
	(0.009)	(0.010)	(0.016)	(0.005)	(0.003)	(0.003)
Adj. R^2	0.135	0.327	0.299	0.180	0.044	0.441
Mean dep.	−0.178	0.673	−0.320	−0.041	−0.111	0.129

Standard errors are between parentheses. The number of observations amounts to 721.
*Refers to a significance level of 5%

that (nascent) entrepreneurship is positively affected by being embedded in a local entrepreneurial environment.

Conclusion

The present paper provides an analysis of the influence of unemployment rates and other regional characteristics on entry, exit and net entry of firms in Italian provinces. It considers six different sectors of the economy and finds that the effect of unemployment is sector-dependent in Italy. However, the results show that there is a main negative effect of unemployment on both firm entry and exit. This suggests a lack of dynamics in the regional labor markets in Italy. The study has some limitations. The level of aggregation (at the sectoral level) is still relatively high. In addition, possible effects of adjacent provinces are not taken into account. However, the results are quite clear-cut across sectors: unemployment does not disappear by the unemployed disproportionally starting up new firms.

References

Acs, Z. J. (2006). New firm formation and the region: Empirical results from the United States. In E. Santarelli (Ed.), *Entrepreneurship, growth and innovation: The dynamics of firms and industries* (pp. 106–133). New York: Springer.

Acs, Z. J., & Armington, C. (2004). The impact of geographic differences in human capital on service firm formation rates. *Journal of Urban Economics, 56*, 244–278.

Aghion, P., & Bolton, P. (1997). A theory of trickle-down growth and development. *Review of Economic Studies, 64*, 151–172.

Arauzo-Carod, J., & Teruel-Carrizosa, M. (2005). An urban approach to firm entry: The effect of urban size. *Growth and Change, 36*, 508–528.

Armington, C., & Acs, Z. J. (2002). The determinants of regional variation in new firm formation. *Regional Studies, 36*, 33–45.

Audretsch, D. B., Carree, M. A., Van Stel, A. J., & Thurik, A. R. (2005). Does self-employment reduce unemployment?, Discussion Paper 07-2005 on Entrepreneurship, Growth and Public Policy, Jena, Germany: Max Planck Institute of Economics.

Audretsch, D. B., & Fritsch, M. (1994). The geography of firm births in Germany. *Regional Studies, 28*, 359–365.

Audretsch, D. B., & Fritsch, M. (1999). The industry component of regional new firm formation processes. *Review of Industrial Organization, 15*, 239–252.

Audretsch, D. B., & Jin, J. (1994). A reconciliation of the unemployment—new firm start-up paradox. *Small Business Economics, 6*, 381–385.

Buzzelli, M. (2005). What explains firm transience in house-building? A regional analysis of Ontario, Canada, 1991 and 1996. *Regional Studies, 39*, 699–712.

Campbell, C. M. III (1996). The effects of state and industry economic conditions on new firm entry. *Journal of Economics and Business, 48*, 167–183.

Carree, M. A. (2002). Does unemployment affect the number of establishments? A regional analysis for US states. *Regional Studies, 36*, 389–398.

Carree, M. A. (2006). On factors promoting and hindering entry and exit. In S. Parker (Ed.), *The life cycle of entrepreneurial ventures, International Handbook Series on Entrepreneurship* (vol. 3, pp. 161–183). Springer.

Carree, M. A., & Thurik, A. R. (1996). Entry and exit in retailing: Incentives, barriers, displacement and replacement. *Review of Industrial Organization, 11*, 155–172.

Davidsson, P., Lindmark, L., & Olofsson, C. (1994). New firm formation and regional development in Sweden. *Regional Studies, 28*, 395–410.

Earle, J. S., & Sakova, Z. (2000). Business start-ups or disguised unemployment? Evidence on the character of self-employment in transition economies. *Labour Economics, 7*, 575–601.

Evans, D. S., & Leighton, L. S. (1990). Small business formation by unemployed and employed workers. *Small Business Economics, 2*, 319–330.

Foti, A., & Vivarelli, M. (1994). An econometric test of the self-employment model: The case of Italy. *Small Business Economics, 6*, 81–93.

Fritsch, M., & Falck, O. (2003). New firm formation by industry over space and time: A multi-level analysis, DIW Berlin Discussion Paper 322, Berlin: German Institute for Economic Research.

Fritsch, M., & Mueller, P. (2004). Effects of new business formation on regional development over time. *Regional Studies, 38*, 961–975.

Garofoli, G. (1994). New firm formation and regional development: The Italian case. *Regional Studies, 28*, 381–393.

Guesnier, B. (1994). Regional variation in new firm formation. *Regional Studies, 28*, 347–358.

ISTAT (2005). La misura dell'occupazione non regolare nelle stime di contabilità nazionale. Con ti Nazionali—Statistiche in breve, Roma.

Knight, F. H. (1921). *Risk, uncertainty and profit*. New York: Houghton Mifflin.

Lee, S. Y., Florida, R., & Acs, Z. J. (2004). Creativity and entrepreneurship: A regional analysis of new firm formation. *Regional Studies, 38*, 879–891.

Love, J. H. (1996). Entry and exit: A county-level analysis. *Applied Economics, 28*, 441–451.

Mueller, P. (2006). Entrepreneurship in the region: Breeding ground for nascent entrepreneurs? *Small Business Economics, 27*, 41–58.

Oxenfeldt, A. (1943). *New firms and free enterprise*. Washington, DC: American Council on Public Affairs.

Pfeiffer, F., & Reize, F. (2000). Business start-ups by the unemployed—an econometric analysis based on firm data. *Labour Economics, 7*, 629–663.

Reynolds, P. D., Miller, B., & Maki, W. R. (1995). Explaining regional variation in business births and deaths: US 1976–88. *Small Business Economics, 7*, 389–407.

Ritsilä, J., & Tervo, H. (2002). Effects of unemployment on new firm formation: Micro-level panel data evidence from Finland. *Small Business Economics, 19*, 31–40.

Storey, D. J. (1991). The birth of new firms—does unemployment matter? A review of the evidence. *Small Business Economics, 3*, 167–178.

Sutaria, V., & Hicks, D. A. (2004). New firm formation: Dynamics and determinants. *The Annals of Regional Science, 38*, 241–262.

Tambunan, T. (1992). Economic development and small scale enterprises in Indonesia. *Entrepreneurship and Regional Development, 4*, 85–98.

Tambunan, T. (1994). Rural small-scale industries in a developing region: Sign of poverty or progress? A case study in Ciomas Subdistrict, West-Java Province, Indonesia. *Entrepreneurship and Regional Development, 6*, 1–13.

Thurik, A. R. (2003). Entrepreneurship and unemployment in the UK. *Scottish Journal of Political Economy, 50*, 264–290.

Unioncamere (2002). *Osservatorio Unioncamere sulla Demografia delle Imprese*. Unioncamere, Roma.