Alma Mater Studiorum Università di Bologna
LMEC – Department of Economics
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Entrepreneurship: Economics and Policy

Lecture 1

Prof. Enrico Santarelli
enrico.santarelli@unibo.it
http://www2.dse.unibo.it/santarel/

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Entrepreneurship: Economics and Policy

LIST OF TOPICS COVERED: Defining and measuring entrepreneurship; Theories of entrepreneurship; Determinants of entrepreneurship; Entry costs, market structure, and welfare; Strategic behaviour, entry and exit; Entrepreneurship, job creation, and innovation; Entrepreneurship and growth; New firm survival; The knowledge filter: from entrepreneurship to economic growth;The locus of policy-making for promoting entrepreneurship and alleviating the negative consequences of globalization.

EDUCATIONAL OBJECTIVES: The aim of the course is to describe the role of entrepreneurship in the globalized economy. This will provide students with the training and knowledge necessary to increase the success of entrepreneurs and the effectiveness of economic policy at all stages.

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Entrepreneurship: Economics and Policy

TEACHING FORMAT: Lectures, discussion of cases.
ASSESSMENT: Coursework, Final exam.
REQUIRED READINGS:

Parker, S. (2009), *The Economics of Entrepreneurship*, Cambridge: Cambridge University Press (Chapters 1, 2, 4, 7, 10, 11, 14).

Cabral, L. (2000), *Introduction to Industrial Organization*, Cambridge (MA): MIT Press (Chapters 14 and 15).

SUPPLEMENTARY READINGS:

Audretsch, D. B. (2007), *The Entrepreneurial Society*, Oxford: Oxford University Press;

Brock, W. A. and D. S. Evans (1989), "Small Business Economics", *Small Business Economics*, 1(1), pp. 7-20.

Wennekers, S. and R. Thurik (1999), "Linking Entrepreneurship and Economic Growth", *Small Business Economics*, 13(1), pp. 27-55.

Acs, Z. J., P. Braunerhjelm, D. B. Audretsch and B. Carlsson (2009), The Knowledge Spillover Theory of Entrepreneurship, *Small Business Economics*, 32(1), pp. 15-30;

E. Santarelli and M. Vivarelli (2007), "Entrepreneurship and the Process of Firm's Entry, Survival and Growth", *Industrial and Corporate Change*, 16(3), pp. 455-488;

E. Santarelli, M. Carree and I. Verheul. (2009), Unemployment and firm entry and exit: An update on a controversial relationship, *Regional Studies*, 43(8), pp. 1061-1073.

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Firm size distribution

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Perfect competition model - predictions

- 1 **Atomicity**:
  - There are many suppliers in the market, each of which so small that its actions have no significant impact on other suppliers;
- 2 **Product homogeneity**:
  - All firms supply the same product
- 3 **Perfect information**:
  - All economic agents (consumers and firms) know the prices set by all firms
- 4 **Technological symmetry**:
  - All firms have equal access to the same technology;
- 5 **Free entry and no sunk costs of entry**.

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Industry concentration and market structure

- Perfect competition model says very little about firm size distribution, providing no answer to questions such as:
  - What is the number of firms in equilibrium?
  - What is the size of each firm?
- This implies that (almost) any number and size distribution of firms is possible, e.g. the flat distribution.

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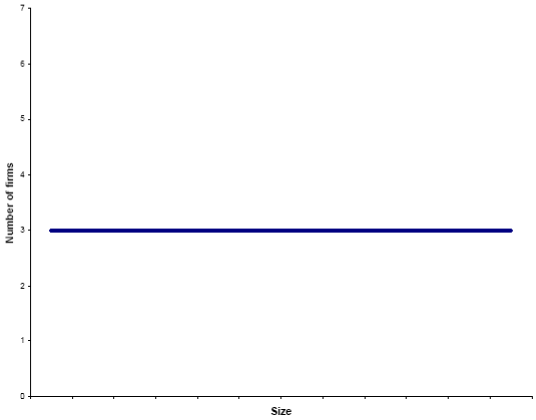
Firm size distribution – In theory



Flat distribution

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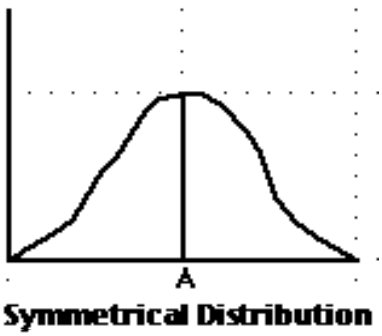
Firm size distribution – In theory



A = mode = median = mean.

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Industry concentration and market structure

- The empirical evidence contrasts the predictions of the perfect competition model, showing that:
  - industry-specific factors and market size determine each firm's size and the number of firms in any industry;
  - The typical distribution of firm size in most industries is a log-normal one.

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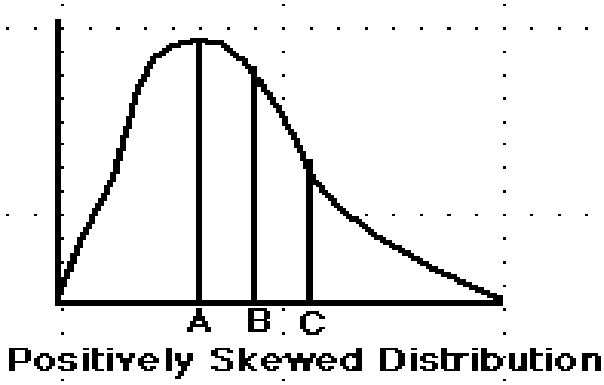
Firm size distribution – In practice



A = mode;
B = median;
C = mean.

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Theories of entrepreneurship

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Entrepreneurship: "Official" Definition

- According to the European Commission (2008), *Entrepreneurship* refers to "an individual's ability to turn ideas into action. It includes **creativity**, **innovation** and **risk taking**, as well as the ability to plan and manage projects in order to achieve objectives. This supports everyone in day-to-day life at home and in society, makes employees more aware of the context of their work and better able to seize opportunities, and provides a foundation for entrepreneurs establishing a social or commercial activity".

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Entrepreneurship: Role (general)

- "The entrepreneur is at the same time one of the most intriguing and one of the most elusive characters … in economic analysis. He has long been recognised as the apex of the hierarchy that determines the behaviour of the firm and thereby bears a heavy responsibility for the vitality of the free enterprise society" (Baumol, 1968, p. 64).
- Owner-managers of small enterprises run the majority of businesses in most countries (Parker, 2009, p. 1):
  - Which provide goods and services that are usually ignored by the largest firms.

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Early Theories of Entrepreneurship

1- Arbitrage and the bearing of risk and uncertainty.

Richard Cantillon (1755) underlined the importance of the entrepreneur as an arbitrageur or speculator who conducts all exchanges and bears risk as a result of buying at certain prices and selling at uncertain ones:

- **Risk theory of profit**: anyone who receives an uncertain income can essentially be regarded as an entrepreneur.
- **Successful entrepreneurs**: relieve the paralysis engendered by uncertainty, allow production and exchange to occur and market equilibrium to be attained.
- **Unsuccessful entrepreneurs**: go out of business, so that only the 'fittest' survive.
- **Entrants**: appear when profits persist;
- **Innovation**: NO
- **Perception**: YES

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Early Theories of Entrepreneurship

1.1- The 'alert' entrepreneur.

Israel Kirzner (1973, 1985) emphasized the importance of the entrepreneur as a middleman or an arbitrageur who is *alert* to profitable opportunities that are in principle available to everyone:

- **Risk theory of profit**: anyone who receives an uncertain income can essentially be regarded as an entrepreneur.
- **Successful entrepreneurs**: relieve the paralysis engendered by uncertainty, allow production and exchange to occur and market equilibrium to be attained.
- **Unsuccessful entrepreneurs**: go out of business, so that only the 'fittest' survive.
- **Entrants**: appear when profits persist;
- **Innovation**: NO
- **Perception**: YES

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Early Theories of Entrepreneurship

1.2- Entrepreneurship, risk, and uncertainty.

Frank Knight (1973, 1985) assumed that individuals are opportunists, who can turn their hand to entrepreneurship when the risk-adjusted returns are relatively favorable, or alternatively to paid employment when they are not. He emphasized the fact that entrepreneurs have limited information about the availability of natural resources, technological change and prices. Hence, entrepreneurs need to possess characteristics such as:

- **Self-confidence.**
- **Judgement**.
- **A ventursome nature**.
- **Foresight**.
- **Luck**.
- **Perception**.

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Early Theories of Entrepreneurship

2- Coordination of factors of production.

According to Jean-Baptiste Say (1828) the chief contribution of the entrepreneur is to combine and coordinate factors of production, and taking the residual as profit. Personal characteristics of the entrepreneur (which have to be present simultaneously):

- **Judgement**.
- **Perseverance**.
- **Experience**.
- **Problem-solving abilities**.

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Early Theories of Entrepreneurship

3- Innovation and creative destruction.

According to Joseph Schumpeter (1912, 1934, 1942) entrepreneurship entails innovation. The entrepreneur does not make gradual changes to existing production methods, but he develops new products that make discrete discontinuous changes which shift the paradigm altogether, breaking organisational routines and driving economic development. The entrepreneur:

- **Is never a risk-bearer** ("external financiers" (capitalists, bankers) bear the risk of entrepreneurial activities.
- **No Intrapreneurship** (the rise of large monopolistic firms leads to the eventual demise of the entrepreneur).

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"Schumpeterian" entrepreneurship

- Entrepreneurially active individuals are the leading forces of structural change (agents of change);
- Entrepreneurs are "energetic types" who display their "essential features" by bringing the "new" in various activities and who "break with the established routines usually adhered to by managers" (Schumpeter, 1911, p. 171).
- "It is only in contemporary economy that the energetic type has developed to such a significant extent in the economic field as to constitute a special class of economic subject and be given his own name: entrepreneur".

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Early Theories of Entrepreneurship

4- Leadership and motivation.

According to Harvey Leibenstein (1968) entrepreneurs bring about changes of a **gradual nature** to existing products and processes, through a combination of leadership, motivation, ability to resolve crises and risk-taking. In fact:

- **Large bureaucratic firms may find it costly to develop radical innovations since,** due to high agency problems, they may optimally pass over uncertain new technology development in favor of more routine ones, despite the more modest returns of the latter.

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Early Theories of Entrepreneurship

5- Personal or psychological traits.

Successful entrepreneurs possess special innate personal characteristics. Including:

- **Need for achievement**. A society with a high level of n-Ach will produce more energetic entrepreneurs.
- **High internal locus of control**. Entrepreneurs have an innate belief that their performance depends largely on their own actions, rather than external factors.
- **Tolerance of ambiguity**. Entrepreneurs have a greater capacity than employees for dealing with environments where the overall framework is ill-defined, or ambiguous (preference for uncertainty?).
- **Other**. Competitiveness, assertiveness, impatience, self-efficacy, intuition, conscientiousness, openness to experience, ecc.

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Occupational choice model of entrepreneurship

1 – Homogeneous agents

Main differences between 'early' and 'modern' theories of entrepreneurship:

- **Dominance of the utility maximizing** paradigm in modern economic research:
  - Individuals choose between entrepreneurship and other options (usually taken to be paid employment→occupational choice)
- **Explicit use of simplifying assumptions:**
  - Existence of competitive product markets;
  - Known technology;
  - Price-taking workers and entrepreneurs

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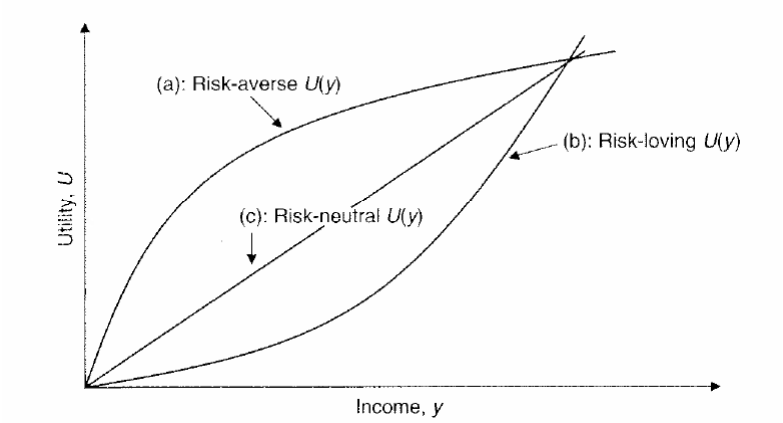
Occupational choice model of entrepreneurship

U(y) is an increasing function of y:

- (a) concave function of y: extra units of y increase U by progressively smaller amounts;
- (b) convex function of y: extra units of y increase U by progressively greater amounts;
- (c) linear function of y: embodies risk neutrality



Occupational choice model of entrepreneurship

1.1 – Homogeneous agents: static model

Individuals choose between working for a wage of w and producing output as entrepreneurs in return for profit (π). If $\pi > w$, workers switch into entrepreneurship:

- **The extra output produced by the new entrepreneurs decreases the price it is sold for,** reducing π until it comes into equality with w:
  - π cannot be less than w because otherwise entrepreneurs would quit, reducing output and thereby increasing price until equality was restored.
  - It follows that $\pi = w$ is an equilibrium condition.

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Occupational choice model of entrepreneurship

1.2 – Homogeneous agents: dynamic model(s)

Individuals might incur costs of switching occupations. These could be:

- **Non-pecuniary**: sudden loss of a pleasant compensating differential, disruption to an accustomed lifestyle, stress from change, stigma from failure.
- **Economic**: lost sector-specific experience, costs of raising start-up capital, retraining costs, other costs related to exit barriers:
  - sunk costs of capital with limited resale value, prior commitments to customers, etc.

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Occupational choice model of entrepreneurship

1.3 – Homogeneous agents: dynamic model(s)

Individuals might incur costs of switching occupations. These could be:

- **Non-pecuniary**: sudden loss of a pleasant compensating differential, disruption to an accustomed lifestyle, stress from change, stigma from failure.
- **Economic**: lost sector-specific experience, costs of raising start-up capital, retraining costs, other costs related to exit barriers:
  - sunk costs of capital with limited resale value, prior commitments to customers, etc.

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Occupational choice model of entrepreneurship

1.4 – Homogeneous agents: dynamic model(s)

When do people switch between occupations (Dixit and Rob, 1994)?

a) Only when average incomes in entrepreneurship reach some 'upper trigger' point will people become entrepreneurs.

b) And they will only leave entrepreneurship in the presence of the adjustment cost if incomes drop to some lower trigger point.

*c) B*etween these two trigger points individuals remain in their current occupation, which means that:

- there is hysteresis (i.e. path-dependence) in occupational choice, with individuals who may remain in entrepreneurship even if the returns there at a given instant are less than those available in an alternative occupation. In fact:

i) There might be switching costs;

ii) There might be an option value to wait and see if conditions in the currently unfavourable occupations improve

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Occupational choice model of entrepreneurship

1.3 Oxenfeldt (1943)

$\Delta Y = E(Y_\pi - Y_w)$

R = f[var(Y_{se})] – Risk can give agents an option to wait before switching (Dixit, 1989)

SwC = Switching costs (←);

I_{ent} = Entrepreneurial incentive;

$$I_{ent} = f(\Delta Y, R, SwC)$$
$$(+, -, -)$$

with:

R = Risk factor (entrepreneurship);

Y_w = Expected income from choosing 'paid employment'

Y_π = Expected income from choosing 'entrepreneurship'

$\Delta Y = Y_\pi - Y_w$;

The likelihood of choosing 'entrepreneurship' is higher when $I_{ent} > 0$.

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Unemployment and Firm Entry and Exit: An Update on a Controversial Relationship

Enrico Santarelli
University of Bologna
Martin Carree
Maastricht University
Ingrid Verheul
Erasmus University Rotterdam

Regional Studies (2009), 43(8), pp. 1061-1073

The issue

- There might be *hystereris* in occupational choice, with individuals reluctant to switch between occupations.
  - Unemployment may be a major determinant of occupational choice
- Large variety in endowment of entrepreneurial factors and labor market (and other) conditions across regional or local entities within one country:
  - likely to last for multiple decades;
  - likely to undermine social cohesion.
- Governments may therefore want to intervene to reduce such regional inequalities by:
  - subsidizing new economic activity in the poorer regional or local entities;
  - raising entrepreneurial skills in society as a whole and stimulating entrepreneurial awareness in young people.
- Intervention may be relevant for regions combining a high level of unemployment with a low propensity to start new businesses.

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Why Italy

- Italy is characterized by a considerable variation in both unemployment rates (e.g., Lecco 2.2%, Enna 28.86%) (→) and in the rate of new firm formation (e.g. Messina 5.41%, Reggio Emilia 9.64%) (→) (although the latter permanently high in general);
- We (re-)examine the issue of regional variation in firm birth rates and the relationship between unemployment and subsequent firm entry and exit with new data covering all 103 Italian provinces for the period between 1997 and 2003.

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Unemployment in Italy (2001)

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	Reggio 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
Pordenone	3.62	Trento	6.82	Cosenza	5.16
Biella	3.75	Aosta	6.92	Lecce	5.40
Bologna	3.84	Caltanissetta	6.96	Sassari	5.40
Siena	4.06	Varese	6.99	Salerno	5.40
Como	4.11	Perugia	7.01	Milano	5.42
	...		...		...
Taranto	20.16	Brindisi	8.24	Venezia	6.81
Lecce	20.78	Taranto	8.33	Alessandria	6.83
Vibo Valentia	21.03	Novara	8.36	Vercelli	6.90
Crotone	21.19	Crotone	8.39	Pescara	6.93
Caltanissetta	22.88	Massa	8.40	Gorizia	6.93
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

Note: The 15 provinces with the lowest unemployment, entry and exit rates are presented in the upper part of the table, while the 15 provinces with the highest rates are presented in the lower part. The averages are for the period 1996–2002 for the unemployment rate, and the period 1997–2003 for the entry and exit rates.

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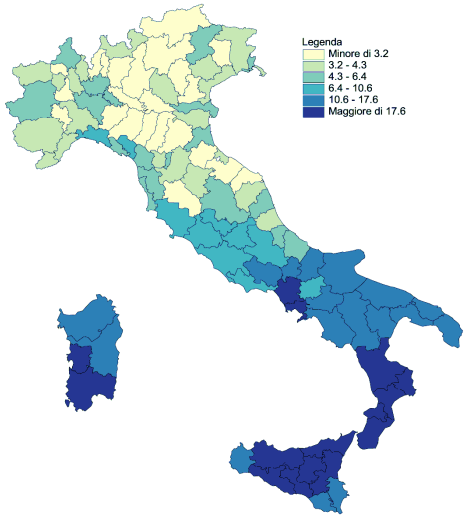
Source: own elaborations on ISTAT

Unemployment in Italy (2001)



Source: ISTAT

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Entrepreneurship in Italy

Province	Entry rate (average)	Province	Exit rate (average)
Messina	5.41	Messina	4.10
Biella	6.19	Palermo	4.37
Bolzano-Bozen	6.33	Regio Calabria	4.39
Roma	6.38	Roma	4.46
Lodi	6.52	Catania	4.74
Sondrio	6.54	Nuoro	4.75
Milano	6.63	Napoli	4.80
Enna	6.64	Bolzano-Bozen	5.01
Belluno	6.70	Potenza	5.08
Ascoli Piceno	6.79	Ragusa	5.12
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	.....		.....
Crotone	8.39	Pescara	6.93
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Prato	8.60	Ferrara	7.04
Vibo Valentia	8.60	Livorno	7.07
Caserta	8.75	Udine	7.08
Rimini	8.79	Rimini	7.09
Livorno	8.84	Savona	7.46
Reggio Emilia	9.64	Prato	7.96

Source: own elaborations on Unioncamere database

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Theoretical background: the origins

- Knight (1921): individuals have to make a decision about how to allocate their time and abilities among **three** different types of activity:
  - Unemployment;
  - Entrepreneurship (self-employment);
  - wage-employment.
- The relative price of these activities ultimately determines an individual's occupational decision.
- Link between unemployment and a 'defensive' type of entrepreneurship later refined by Oxenfeldt (1943):
  - individuals with higher probability of becoming unemployed or low prospects for wage-employment, tend to become self-employed.

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Theoretical background: an ambiguous relationship

- **"Unemployment push" effect on self-employment**:
  - unemployed individuals more likely to start their own business as the opportunity costs of self-employment are low (Evans-Leighton, 1990; Audretsch et al., 2005; Carree, 2002) **unemployment** ↓;
- **"Unemployment negative" effect on self-employment:**
  - unemployed people may be less well-endowed in terms of human or entrepreneurial capital than employed people, inhibiting business start-up by the unemployed. **unemployment** ↑.
- **"Self-employment push" effect on employment**:
  - 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 (e.g., previously unemployed workers) (Storey, 1991), given that in a situation of unemployment, employment creation is enhanced as it is cheaper to hire new workers (Campbell, 1996) **unemployment** ↓;
- **Creative destruction "Schumpeter" effect**:
  - In the short-term self-employment may result in higher unemployment: the behavior of entrepreneurs in the economic landscape is likely to lead to increased unemployment through innovation and accelerated growth (Aghion and Bolton, 1997) **unemployment** ↑.

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Theoretical background: Unemployment and firm *exit*

- New firm formation can be measured in terms of both *gross* entry and *net* entry rates, to take into account the relationship between unemployment and exit, since:
  - Unemployment is not only likely to influence entry but also exit, for example by producing higher mortality rates (Buzzelli, 2005; Love, 1996);
  - higher levels of unemployment may provide an incentive to enter, but also a disincentive to exit because of lack of job alternatives (Carree – Thurik, 1996).

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Model(s)

- We use two models to focus on Entry (E), Exit (X) and Net entry (E – X) and the way they are affected by region effect:
  - In the first model we do not take cross-border effects into account and concentrate only on individuals, unemployed or employed, starting or closing a business in the province they live in;
  - In the second model we incorporate cross-border effects by taking into account unemployed and employed individuals from adjacent provinces.

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Model 1

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

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

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

- **Underlying hypothesis**: new firms are started by employed or unemployed individuals from within the province.
- **Question**: whether in regions with high unemployment there is higher (net) entry and lower exit of firms than in regions with lower unemployment.
- Index *i* represents the province (*i* = 1,..., 103) and the index *t* stands for year (*t* = 1997,..., 2003);
- L_{it} = total labor force (employed + unemployed);
- U_{it} = provincial number of unemployed;
- Z_{it} = selection of other explanatory variables.

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Measurement issues

- The entry and exit rate of firms can be measured in different terms:
  - in labor terms, assuming that one firm represents one self-employed individual (labor market approach);
  - in terms of number of firms (ecological approach).
- In this paper the entry and exit rates are relative to total labor force, i.e., entry and exit rates can be presented as follows:

$$e_{it} = E_{it} / L_{i,t-1} \text{ and } x_{it} = X_{it} / L_{i,t-1}.$$

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Estimation issues - model 1 (no cross-border effects)

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

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

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

- Equations (1)-(3) can be estimated in absolute numbers, but also in relative terms.
- A disadvantage of using absolute numbers is that large provinces in terms of population (e.g., Milano and Roma) may dominate the regression outcomes.
- In the relative model (←) all variables are divided by the labor force in the previous year ($L_{i,t-1}$)

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Explanatory variables

- $L_{i,\,t-1}$ = total labor force in the previous year. For each individual in the labor force, (self-)employed or unemployed, there is a probability *a* that (s)he starts an enterprise;
- $U_{i,\,t-1}$ = number of unemployed individuals. There is an additional probability *b* for the unemployed to start a firm (this probability can also be negative). Unemployment has a positive (push) effect on entry if $b > 0$. The parameter *e* in equation (2)(in case negative) represents the effect of unemployment preventing self-employed to stop their business, because of lack of job alternatives.

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Control variables (Z term)

- *Patents* = number of patents in 2003 per 1000 firms; indication of the extent to which a province is characterized by high-tech industry;
- *VA Growth* = measured by the relative change in the provincial value added in the previous period;
- *Tourists* = (number of arrivals) indicator of the extent to which the provincial economy benefits from tourism;
- *City* = dummy variable with value 1 for the four largest (in terms of resident population) cities (Torino, Milano, Napoli and Roma), 0 otherwise;

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Control variables (Z term)

- *IndDist* = presence of industrial districts, measured as a dummy variable, *inddist*, with value 1 for provinces that have at least one industrial district (this variable equal to 1 for 22 provinces out of 103);
- *Wage* = regional (manufacturing) wage level. This is the only variable that is not available at the provincial level, but it is available at the aggregate level of the 20 Italian regions. High wage levels are expected to have a negative effect on firm entry and a positive effect on firm exit.
- *VAPC* = value added per capita based upon the provincial value added data (controls for the fact that macro-regions differ in terms of level of development);
- *Commerce* = ratio of the number of registered incumbent firms in the commercial sector (i.e., retail and wholesale) over the number of registered incumbent manufacturing firms. We compare the size of this sector to that of manufacturing which, on average, has higher barriers to entry as well as a higher average firm size.

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Model 2 – Entry (cross-border effects)

- The *second* model incorporates the effects of employment and unemployment in adjacent provinces, by assuming that individuals in province *i* may start enterprises in the adjacent province *j*, but also the other way around;
- Assuming that the relative size of a province – with respect to adjacent ones – determines the probability of a person starting in his/her province *i*;
- This means that we should **not only consider the adjacent provinces, but also the provinces adjacent to those provinces**.

The probability of a person starting in his/her home province *i* is then $L_i/(L_i + \sum_{j \in A_i} L_j)$ where labor force is taken as size indicator of the province and A_i is the set of provinces adjacent to province *i*. Likewise, the probability of an individual from an adjacent province *j* starting in province *i* is $L_j/(L_j + \sum_{k \in A_j} L_k)$. This leads to the following model for entry:

Model 2 – Entry, exit, net entry

$$(4)\ E_{it} = a_t L_{i,t-1} + b^P \frac{U_{i,t-1} L_{i,t-1}}{L_{i,t-1} + \sum_{j \in A_i} L_{j,t-1}} + b^{AP} \sum_{j \in A_i} \frac{U_{j,t-1} L_{i,t-1}}{L_{j,t-1} + \sum_{k \in A_j} L_{k,t-1}} + cZ_{it} + \varepsilon_{it}^E =$$

$$a_t L_{i,t-1} + b^P UP_{i,t-1} + b^{AP} UAP_{i,t-1} + cZ_{it} + \varepsilon_{it}^E$$

And the following models for exit and net entry:

$$(5)\ X_{it} = d_t L_{i,t-1} + e^P UP_{i,t-1} + e^{AP} UAP_{i,t-1} + fZ_{it} + \varepsilon_{it}^X$$

$$(6)\ E_{it} - X_{it} = g_t L_{i,t-1} + h^P UP_{i,t-1} + h^{AP} UAP_{i,t-1} + jZ_{it} + \varepsilon_{it}^N$$

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Model 2 – Exit and net entry

In contrast to the first model, the second model allows for unemployed from within the province to start-up in adjacent provinces and the other way around. Because it is expected that unemployed individuals are more likely to consider starting up a business in the own province than in adjacent provinces, we expect that b^P exceeds b^{AP}. Similarly, it is expected that e^P is larger than e^{AP} and h^P is larger than h^{AP}. Again, equations (4) to (6) are estimated in relative terms (relative to $L_{i,t-1}$), resulting into the following set of equations:

(4a) $$e_{it} = a_t + b^P UP_{i,t-1} / L_{i,t-1} + b^{AP} UAP_{i,t-1} / L_{i,t-1} + cZ_{it} / L_{i,t-1} + \varepsilon_{it}^E$$

(5a) $$x_{it} = d_t + e^P UP_{i,t-1} / L_{i,t-1} + e^{AP} UAP_{i,t-1} / L_{i,t-1} + fZ_{it} / L_{i,t-1} + \varepsilon_{it}^X$$

(6a) $$e_{it} - x_{it} = g_t + h^P UP_{i,t-1} / L_{i,t-1} + h^{AP} UAP_{i,t-1} / L_{i,t-1} + jZ_{it} / L_{i,t-1} + \varepsilon_{it}^N$$

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Summary statistics

Table 2. Summary statistics

Variable	Description	Mean	St.dev.
E	Number of entrants	3143.7	3778.2
X	Number of exits	2442.4	2810.1
E-X	Net number of entrants	701.3	1385.6
U	Number of unemployed	24.52	38.08
L	Labor force	226.86	255.01
e	Entry rate	13.97	3.91
x	Exit rate	11.09	3.28
e-x	Net entry rate	2.88	2.67
u	Unemployment rate	0.105	0.075
up	Provincial size-weighted u	0.023	0.031
uap	Adjacent provincial size-weighted u	0.084	0.070
patents	Number of patents per firm	0.954	1.392
growth	Value added growth rate	0.045	0.025
tourists	Relative number of tourists	3.73	3.91
city	Dummy four largest cities	0.039	0.193
vapc	Value added per capita	16.86	4.29
inddist	Industrial district dummy	0.214	0.410
wage	Average wage level	15.45	1.65
commerce	Ratio of firms in retail/wholesale versus those in manufacturing	2.23	0.76

Notes: Average values are presented for a 7-year period.

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Estimation problems

- **Relative rates:**
- High negative correlation (-0.825) between $u_{i,t-1}$ and *vapc*, denoting that unemployment tends to be lower in richer provinces;
  - Consequence: including both unemployment and value added per capita is likely to have consequences for the outcomes of the relative model;
  - However, excluding value added per capita may lead to misinterpretation of the unemployment effect (where the unemployment effect is due to differences in wealth between provinces);
- Dilemma dealt with by including both variables.

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Table 3. Estimation results for entry and exit models (1a) to (3a)

Model Dependent	(1a) Entry rate	(2a) Exit rate	(3a) Net entry rate
y1997	16.41*	14.45*	1.96*
	(1.94)	(1.69)	(0.99)
y1998	16.43*	13.11*	3.32*
	(1.97)	(1.72)	(1.01)
y1999	19.62*	12.99*	6.62*
	(2.02)	(1.76)	(1.03)
y2000	20.71*	13.06*	7.65*
	(2.06)	(1.80)	(1.05)
y2001	20.97*	12.92*	8.05*
	(2.12)	(1.85)	(1.08)
y2002	20.91*	13.65*	7.27*
	(2.17)	(1.89)	(1.11)
y2003	20.05*	12.79*	7.26*
	(2.21)	(1.93)	(1.13)
unempl	−11.24*	−12.91*	1.67
	(3.77)	(3.29)	(1.92)
patents	−0.174	−0.158	−0.016
	(0.124)	(0.108)	(0.063)
growth	4.082	−2.401	6.483*
	(5.869)	(5.129)	(2.994)
tourists	−0.001	−0.024	0.023
	(0.039)	(0.034)	(0.020)
city	1.142	−0.056	1.198*
	(0.760)	(0.664)	(0.388)
inddist	0.995*	0.623*	0.372*
	(0.358)	(0.312)	(0.182)
wage	−0.651*	−0.517*	−0.134*
	(0.116)	(0.101)	(0.059)
vacp	0.203*	0.299*	−0.096*
	(0.083)	(0.072)	(0.042)
commerce	0.987*	1.042*	−0.055
	(0.298)	(0.260)	(0.152)
Adjusted R^2	0.229	0.167	0.580
Mean dependent	13.97	11.09	2.88

Note: Standard errors are given in parentheses. The number of observations is 721. *5% level of significance. Entry and exit equations are estimated using seemingly unrelated regressions.

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Table 4. Estimation results for entry and exit models (4a) to (6a)

Model Dependent	(4a) Entry rate	(5a) Exit rate	(6a) Net entry rate
y1997	17.80*	16.21*	1.59
	(1.83)	(1.57)	(0.94)
y1998	17.94*	15.03*	2.91*
	(1.85)	(1.59)	(0.95)
y1999	21.19*	15.01*	6.19*
	(1.90)	(1.63)	(0.97)
y2000	22.32*	15.12*	7.20*
	(1.93)	(1.66)	(0.99)
y2001	22.56*	14.97*	7.59*
	(1.99)	(1.71)	(1.02)
y2002	22.50*	15.71*	6.79*
	(2.04)	(1.75)	(1.05)
y2003	21.67*	14.91*	6.76*
	(2.08)	(1.79)	(1.07)
unempl(P)	−24.99*	−37.57*	12.58*
	(5.73)	(4.92)	(2.93)
unempl(AP)	−15.53*	−15.45*	−0.08
	(2.88)	(2.47)	(1.47)
patents	−0.127	−0.119	−0.008
	(0.122)	(0.105)	(0.062)
growth	5.921	−0.132	6.053*
	(5.769)	(4.947)	(2.953)
tourists	−0.024	−0.045	0.021
	(0.039)	(0.033)	(0.020)
city	1.647*	1.134	0.513
	(0.791)	(0.679)	(0.405)
inddist	1.037*	0.701*	0.335
	(0.352)	(0.302)	(0.180)
wage	−0.646*	−0.550*	−0.096
	(0.115)	(0.010)	(0.059)
vacp	0.118	0.211*	−0.093*
	(0.077)	(0.066)	(0.039)
commerce	1.183*	1.350*	−0.166
	(0.288)	(0.247)	(0.147)
Adjusted R^2	0.255	0.224	0.592
Mean dependent	13.97	11.09	2.88

Note: Standard errors are given in parentheses. The number of observations is 721. *5% level of significance. Entry and exit equations are estimated using seemingly unrelated regressions.

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Summary of main results (Table 3) - Time effect

- Seemingly Unrelated Regressions for estimating the gross entry and exit equations. This allows for possible correlation between the error terms of these equations, due to omitted variables affecting both entry and exit simultaneously;
- Entry increases over the years, starting at a low level in 1997 and 1998, and increasing to a higher level between 1999 and 2003.
- Same time effect cannot be observed for exit.
- Hence, increased entry in the period between 1997 and 2003 may be indication of:
  - a) a policy change (i.e., deregulation, entry subsidies, investment subsidies) in the late 1990s, facilitating firm entry in Italy,
  - b) lack of dynamics in the Italian labor market where individuals are afraid to switch between occupations

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Summary of main results (Table 3) - Unemployment

- Unemployment has predominantly a *positive* effect on *net* entry (E-X), associated to a *negative* effect on the rate of new firm formation and a *negative* effect on entry;
- Finding not necessarily consistent with the "unemployment push" effect, but can rather be attributed to the fact that provinces with high unemployment rates *ceteris paribus* are characterized by low subsequent firm exit rates.
- Ignoring the effect of unemployment on (gross) exit erroneously would have led us to believe that the positive effect of unemployment on *net* entry was caused by increased (gross) entry.

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Summary of main results – Other variables

- **Patents**: negative effect on net entry, indicating that (net) entry is lower (rather than higher) in provinces characterized by high-tech industry; **due to more exit in high-tech areas** (rather than less entry);
- **VAPC growth**: growth in provincial value added (in the previous period) has the expected positive effect on (net) entry. More firms are started in periods of a thriving (provincial) economy;
- **Tourists**: no significant effect on gross entry and exit, and on net entry;
- **City**: four main cities characterized by more entry (large metropolitan areas are typical attractors of new entries). Agglomeration effects in operation (large metropolitan areas as attractors of new firms);

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Summary of main results – Other variables

- **Inddist**: 22 provinces with i.d. characterized by more entry (i.d. provide fertile ground for new local companies, attract outside firms, and are characterized by low barriers to survival (Audretsch *et al*., 1999): these combined effect result in higher net entry);
- **Wage**: has the expected negative effect on firm entry. Surprisingly, it also has a **negative effect on exit**.
- **VAPC**: rich provinces show more entry and exit with the net effect being negative
- **Commerce**: higher rates of entry and exit are found in provinces characterized by a high ratio of commercial versus manufacturing activities. The barriers to entry and exit are usually lower in commercial activities than in the manufacturing sector.

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Summary of main results (Table 4) – Adjacent provinces

- Unemployment in adjacent provinces has a smaller effect on firm entry and exit rates than unemployment in the own province.
- Separating the unemployment effect in own-province and adjacent-province effects results in a significant negative effect of own-province unemployment on entry.
- The other variables in Table 4 show similar effects as those in Table 3, with the only exception of the *city* dummy. The results in Table 4 suggest more gross entry but not more net entry in the four largest cities in Italy.
- The contribution of incorporating unemployment effects of adjacent provinces to explain entry and exit can be seen by the rise in the adjusted R-squared. It rises from 0.229 to 0.255 for the gross entry rate equation and from 0.167 to 0.224 for the exit equation.

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