The relationship between entrepreneurship and unemployment: Is Portugal an outlier?

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Abstract

The present paper examines the relationship between entrepreneurship, as measured by the variation in business ownership rates, and unemployment in Portugal in the period from 1972 to 2002. It concludes that Portugal has been a relative outlier in regard to the effects of entrepreneurship on unemployment when compared with the OECD average. Although the nature of entrepreneurship may be different in the Portuguese case, due to a high proportion of "micro-businesses" created for subsistence which have little impact on growth and employment, this factor does not seem to be the primary reason for the observed discrepancies. The differences between observed levels of unemployment for Portugal and those predicted by a model based on OECD data seem to be mostly associated with macroeconomic fluctuations associated with European business cycles and EU "cohesion" funding, as well as with adjustment costs to new technology adoption which lead to productivity slowdowns, thus increasing the time lag for the effect of entrepreneurship on employment beyond the OECD average.
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1. Introduction

In recent years, the relationship between business ownership (or self-employment) and unemployment has received considerable attention from policy makers in European countries. Persistently high unemployment rates coupled with limited economic growth have triggered policy makers into giving greater importance to entrepreneurship and self-employment as ways to foster economic progress and reduce unemployment.

Europe and other industrialized regions of the globe have experienced considerable industrial restructuring in the last three decades, changing from traditional manufacturing industries towards new and more complex technologies such as electronics, software and biotechnology. In this context, entrepreneurship and small firms play a particularly important role for two main reasons:

 i. first, the use of new technologies has reduced the importance of scale economies in many sectors [1,2];
ii. second, the increasing pace of innovation and the shortening of product and technology life cycles seem to favor new entrants and small firms, which have greater flexibility to deal with radical change than large corporations [3].

Previous work by Audretsch, Carree and Thurik [4] finds that there is a dynamic inter-relationship between self-employment and unemployment rates. On the one hand, unemployment rates may stimulate start-up activity of self-employed. On the other hand, higher rates of self-employment may indicate increased entrepreneurial activity, reducing unemployment in subsequent periods. The present paper focuses on the second part of this relationship; it examines the relationship between entrepreneurship, as measured by the variation in business ownership rates, and unemployment in Portugal in the period from 1972 to 2002. For this purpose, data from the "COMPENDIA" database assembled by EIM, Netherlands is used. The COMPENDIA (COMParative ENtrepreneurship Data for International Analysis) data set uses data from the OECD Labour Force Statistics and other (country-specific) sources to make the self-employment data as comparable as possible across countries. In the data, business ownership (self-employment) is defined as including all individuals owning a business that is not legally incorporated or owning an incorporated business from which they gain profits as well as a salary.

Section 2 of the paper looks at relevant theoretical and empirical background concerning the relationship between entrepreneurship, firm growth and employment. Section 3 outlines the evolution of the Portuguese economy for the period under analysis, focusing more specifically on the business ownership and unemployment rates, thus providing the necessary backdrop for the discussion of the empirical results. Section 4 outlines the empirical approach used and presents the results which are discussed in Section 5. Section 6 concludes.

2. Entrepreneurship, firm growth and unemployment

2.1. Gibrat's Law

Why should an increased amount of entrepreneurial activity impact economic growth and, therefore, unemployment? One approach to address this question can be inferred from the literature on Gibrat's Law [5]. Deriving from the seminal work by Robert Gibrat [6], Gibrat's Law asserts that firm growth is independent of size. Sutton [7] interprets "Gibrat's Legacy", as "The probability that the next opportunity

is taken up by any particular active firm is proportional to the current size of the firm." An important implication of Gibrat's Law is that shifting employment from large to small enterprises should have no impact on total employment, since the expected growth rates of both types of firms are identical. Thus, a restructuring of the economy away from large enterprises and towards small ones should have no impact on the unemployment rate.

However, there is strong and systematic empirical evidence suggesting that, in fact, Gibrat's Law does not hold across a broad spectrum of firm sizes. Comprehensive and exhaustive compilations of studies relating firm size to growth such as, for instance, Sutton [7] have produced what Geroski [8] terms as the stylized fact that smaller firms have higher growth rates than their larger counterparts. Beginning with the pioneering studies by Evans [9,10] and Hall [11], along with Dunne, Roberts, and Samuelson [12], a central finding of this literature is that firm growth is negatively related to firm size and age. These findings have been confirmed in most subsequent studies undertaken, despite differences in country, time period, industry, and methodology used [5]. More specifically, the evidence has been especially strong for the very young and very small firms to outperform their older and larger counterparts in terms of employment creation even when corrected for their higher probabilities of exit.

More recent studies have indicated that the age and size effects disappear after a few years and above a certain employment size [13]. Lotti, Santarelli and Vivarelli [14,15] find that, even if in the years following start-up Gibrat's Law could be rejected, in subsequent years growth rates seem to converge towards a Gibrat-like pattern. Cabral and Mata [16] find that the firm size distribution across most industries is quite skewed to the right at the time of birth but evolves over time towards a more symmetric one.

2.2. The transition from a managerial to an entrepreneurial economy

The economies of developed countries are in a transition from a state in which mass-production was the mainstay of business to an economy in which knowledge intensive industries form the cornerstone of economic activity. Audretsch and Thurik [17,18] refer to this process as the transition from the managed to the entrepreneurial economy. Similarly, Piore and Sabel [1] use the term industrial divide for the "reversal of the trend" from that toward more large firms to that toward more small ones. Jensen [19] refers to the third industrial revolution when describing the same phenomenon. Meredith [20] discusses the advantages of a range of recently developed flexible production techniques for small-scaled enterprises. In the managed economy technological trajectories were relatively well defined and firms were subject to relatively low uncertainty in planning their marketing and R&D activities. Stability, continuity and homogeneity were the cornerstones of the managed economy [17]. Firms focused on the exploitation of scale economies and competed on operational efficiency. In the developed economies of the West, firms were confronted with high transaction costs leading to both horizontal and vertical integration. In the case of Europe and the U.S. the economic structure most conducive to growth favored the dominance of large firms but a turning point occurred in the 1980s and their economies experienced a decreasing concentration of business.

The turning point of the 1980s has had many facets and many consequences. Audretsch and Thurik [17] contrast the most fundamental elements of the managed economy model with those of the entrepreneurial economy model and identify fourteen dimensions as the basis for comparing models of the entrepreneurial and the managed economy. In addition, there are both conceptual and empirical indications that entrepreneurship enhances growth [21]. The quintessential question now is whether, at

the end of the day, the entrepreneurial economy leads to less unemployment than the managed one. In other words: the question is whether a rise in entrepreneurship leads to lower levels of unemployment.

The consequences of different economies to have a different impact on unemployment is one thing; quite different is the question of the determinants of entrepreneurship. The study of entrepreneurship and its determinants has built on a variety of disciplines such as economics, sociology and psychology, reflecting the multidimensional nature of this phenomenon [22]. From an economic theory perspective, the tools of neo-classical microeconomics have provided a framework for studying self-employment decisions, known as the theory of income choice, which has proved useful in describing some of the factors influencing this decision. This approach views agents as (expected) – utility maximizers taking an occupational choice decision – to become employees or entrepreneurs (self-employed) – on the grounds of the utility associated with the returns accruing from the two types of activity (see [23]) for a concise survey. The theory of income choice has been the basis for numerous studies focusing on the decision of individuals to start a firm and become an entrepreneur. This theory suggests that increased unemployment will lead to an increase in start-up activity on the grounds that the opportunity cost of not starting a firm has decreased. However, there is an important counterargument in that unemployed tend to possess lower endowments of human capital and entrepreneurial talent required to start and sustain a new firm, suggesting that high unemployment may be associated with a low degree of entrepreneurial activity.

A low rate of business start-ups may also be a consequence of low economic growth levels, which correlate with higher levels of unemployment. Entrepreneurial opportunities are not just the result of the push effect of (the threat of) unemployment but also of the pull effect produced by a thriving economy as well as by entrepreneurial activities in the past. In addition to unemployment leading to more or less start-up activity, the reverse has also been claimed to hold. New-firm start-ups hire employees, resulting in subsequent decreases in unemployment. But there is a counterargument. The low rates of survival combined with the limited growth of the majority of small firms imply that the employment contribution of start-ups is limited at best, which would argue against entrepreneurial activities reducing unemployment [4].

2.3. Empirical evidence

As Storey [24] documents, the empirical evidence linking unemployment to entrepreneurial activity is fraught with ambiguities. While some studies find that greater unemployment serves as a catalyst for start-up activity [25–31], still others have found that unemployment reduces the amount of entrepreneurial activity [32,33]. The ambiguities found in the empirical evidence reflect these two conflicting forces. It is generally assumed that there is a two-way causation between changes in the level of entrepreneurship and that of unemployment: a "Schumpeter" effect of entrepreneurship reducing unemployment and a "refugee" or "shopkeeper" effect of unemployment stimulating entrepreneurship.

Audretsch et al. [4] try to reconcile the ambiguities found in the relationship between unemployment and entrepreneurship. They present a two-equation model where changes in unemployment and in the number of business owners are linked to subsequent changes in those variables. Their empirical results suggest that the relationship between unemployment and entrepreneurship is, in fact, both negative and positive. Changes in unemployment clearly have a positive impact on subsequent changes in self-employment rates. At the same time, changes in self-employment rates have a negative impact on subsequent unemployment rates. Because these are essentially dynamic intertemporal relationships,
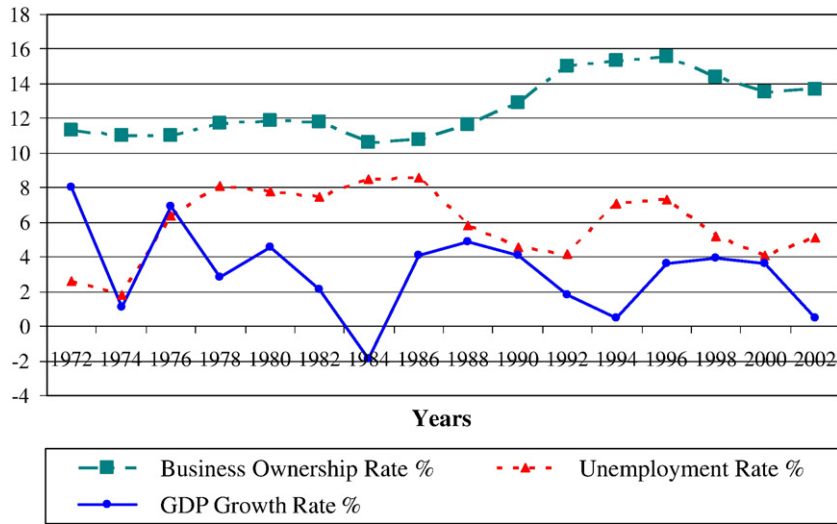
Fig. 1. Unemployment, business ownership and GDP growth in Portugal: 1972–2002. Source: COMPENDIA, OECD and Bank of Portugal.

previous studies estimating contemporaneous relationships have confounded what are, in fact, two relationships each working in the opposite direction and with different time lags.

3. The evolution of the Portuguese economy

To properly assess the evolution of the Portuguese economy in the period 1984–2002, it is necessary to start further back in time, from the early 1970s. This way, one can take into consideration two major external shocks which imparted significant effects on the growth of the Portuguese economy, as well as in its unemployment and business ownership rates, as shown by Fig. 1. These shocks were:

 i. the oil crisis of 1972–73, followed by the revolution of 1974;
ii. entry into the European Union (EU) in 1986.

Until 1974 Portugal was a colonial power, living under a one party regime and holding considerable portions of Africa; since the early 1960s, Portugal had been facing colonial wars on several fronts. During the 1960–73 period, the Portuguese economy increasingly focused on international trade with Western European partners, and less on trade with the colonies; following the post-war growth cycle in Western Europe, Portugal grew at unprecedented rates.[1]

Despite the concentration of economic power in a small number of financial and industrial conglomerates benefiting from government protection, the Portuguese business ownership rate in 1972 was relatively high when compared to the rest of Europe (see Table 1). Most of this self-employment was, however, founded on low productivity agriculture and very small retail businesses intended only for

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[1] For a more detailed description of Portuguese development policies during this period, see [34].

subsistence. Emigration and the mobilization of armed forces shrunk the work force; together with economic growth, this brought about very low levels of unemployment (see Fig. 1).

During 1972–73, Portugal suffered the effects of the rise in overall industrial costs resulting from the increase in oil prices triggered by OPEC. Economic growth slowed down considerably in most OECD countries, thus reducing the demand for Portuguese goods and opportunities for Portuguese workers abroad. In April 1974, a non-violent revolution led by army officers ended the one party regime and made the African colonies independent, leading to a massive inflow of more than half a million refugees. In the period up to late 1975 most property rights were abolished and the main industries and financial services were nationalized. The stock market was virtually eliminated.

The last vestiges of such radical changes were only removed in the early 1980s, in order to pave the way for privatization and EU integration, which occurred in 1986. Meanwhile, Portugal underwent two structural adjustments by the IMF (1977–78 and 1982–83) due to severe current account deficits. As a result of such an assortment of external shocks, the Portuguese economy grew at a very slow rate, experiencing periods of recession. Government intervention supporting many companies facing financial difficulties, coupled with legislation against dismissals and significant increases in public sector employment prevented the unemployment rate from rising to higher levels than those displayed in Fig. 1. While high unemployment and economic instability may have made self-employment more attractive, thus contributing to a rise in business ownership, government policies protecting jobs and increasing the economic role of the public sector yielded the opposite effect, leading to a reduction in business ownership.

After Portugal joined the EU in 1986, the main focus of development policy became the promotion of socio-economic "cohesion" through the granting of funding directed at the improvement of physical and educational infra-structure, as well as providing incentives and financial help for private investment. Funding was awarded for investments in start-up firms, the expansion of incumbents, and also for investment in R&D and environmental improvements. At the outset, eligibility criteria for investment funding gave greater weight to potential demand effects on other industries and location in more depressed geographical areas. Larger firm size was perceived as crucial to ensure competitiveness in the EU market; hence a significant proportion of funding was initially directed at capacity increases by relatively large incumbents.

By the early 1990s, however, the de-regulation of markets brought about by privatization and EU rules, as well as the inflow of EU funding, resulted a fast increase in business ownership. While large investments in infra-structure and productive capacity brought about a significant decrease in unemployment from the outset of EU integration, relatively small average firm size and low entry barriers in most non regulated industries increased possibilities for self-employment. While the global recession of the early 1990s caused an increase in unemployment, the business ownership rate kept growing.

From 1996 onwards the business ownership rate started declining, as did unemployment. It can be suggested that, instead of following the evolution of GDP and unemployment, individual decisions regarding business ownership started anticipating such fluctuations. It can also be argued that, as the Portuguese economy became more integrated in the EU market, consolidation and "shake-out"[2] occurred in some markets thus leading to a reduction in the business ownership rate.

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[2] Klepper [35] discusses the "shake-out" phenomenon in which, following an initial wave of entry, a phase of consolidation is observed in most markets, whereby a dominant product design emerges and scale economies become more prevalent.

Table 1
Business ownership rates in the OECD

	1972	1974	1976	1978	1980	1982	1984	1986	1988	1990	1992	1994	1996	1998	2000	2002
Austria	0,093	0,081	0,077	0,077	0,073	0,065	0,065	0,066	0,069	0,072	0,069	0,072	0,074	0,080	0,083	0,083
Belgium	0,105	0,100	0,098	0,099	0,098	0,099	0,102	0,106	0,109	0,112	0,114	0,116	0,119	0,118	0,117	0,113
Denmark	0,082	0,081	0,081	0,079	0,074	0,070	0,066	0,063	0,056	0,063	0,058	0,059	0,064	0,064	0,061	0,067
Finland	0,066	0,062	0,059	0,059	0,064	0,062	0,066	0,066	0,076	0,081	0,075	0,077	0,080	0,082	0,081	0,079
France	0,113	0,109	0,105	0,103	0,101	0,100	0,098	0,098	0,099	0,098	0,096	0,090	0,088	0,084	0,083	0,081
Germany (West)	0,076	0,073	0,070	0,067	0,066	0,066	0,068	0,069	0,070	0,072	0,073	0,078	0,082	0,085	0,087	0,086
Greece	0,161	0,173	0,179	0,185	0,182	0,186	0,177	0,182	0,186	0,194	0,202	0,201	0,197	0,193	0,191	0,193
Ireland	0,077	0,082	0,082	0,082	0,086	0,083	0,089	0,087	0,101	0,109	0,111	0,113	0,112	0,113	0,113	0,112
Italy	0,143	0,144	0,142	0,146	0,148	0,158	0,165	0,167	0,169	0,175	0,179	0,177	0,183	0,182	0,185	0,183
Luxembourg	0,107	0,100	0,093	0,092	0,087	0,082	0,083	0,078	0,075	0,069	0,064	0,067	0,067	0,063	0,059	0,054
Netherlands	0,100	0,097	0,092	0,087	0,085	0,081	0,081	0,082	0,082	0,085	0,089	0,097	0,102	0,104	0,109	0,108
Portugal	0,113	0,110	0,110	0,117	0,119	0,118	0,106	0,108	0,116	0,129	0,150	0,153	0,156	0,144	0,135	0,137
Spain	0,118	0,116	0,109	0,107	0,110	0,108	0,112	0,114	0,123	0,123	0,129	0,126	0,130	0,130	0,126	0,129
Sweden	0,074	0,071	0,068	0,068	0,070	0,074	0,072	0,066	0,064	0,069	0,072	0,080	0,081	0,082	0,083	0,081
United Kingdom	0,078	0,077	0,074	0,071	0,074	0,082	0,086	0,089	0,101	0,112	0,105	0,111	0,111	0,110	0,105	0,107
Iceland	0,111	0,102	0,099	0,100	0,088	0,086	0,091	0,099	0,101	0,109	0,117	0,125	0,130	0,132	0,133	0,123
Norway	0,097	0,092	0,089	0,087	0,084	0,086	0,087	0,084	0,084	0,077	0,078	0,078	0,071	0,069	0,064	0,065
Switzerland	0,066	0,065	0,069	0,068	0,065	0,066	0,068	0,070	0,071	0,073	0,070	0,074	0,085	0,091	0,087	0,076
USA	0,080	0,082	0,081	0,088	0,095	0,099	0,104	0,103	0,107	0,106	0,103	0,105	0,104	0,103	0,098	0,095
Japan	0,125	0,127	0,126	0,130	0,131	0,129	0,126	0,125	0,123	0,116	0,110	0,105	0,101	0,100	0,097	0,092
Canada	0,079	0,075	0,078	0,085	0,087	0,090	0,100	0,100	0,106	0,108	0,109	0,121	0,128	0,140	0,131	0,122
Australia	0,126	0,137	0,147	0,160	0,168	0,161	0,160	0,165	0,164	0,163	0,169	0,171	0,155	0,156	0,158	0,164
New Zealand	0,106	0,102	0,102	0,095	0,090	0,101	0,114	0,115	0,114	0,115	0,123	0,129	0,139	0,138	0,142	0,135
Total	**0,098**	**0,098**	**0,097**	**0,099**	**0,102**	**0,104**	**0,106**	**0,107**	**0,110**	**0,110**	**0,108**	**0,109**	**0,109**	**0,109**	**0,106**	**0,104**

Source: COMPENDIA (2002.1), EIM.

4. Empirical analysis

The empirical analysis conducted in this paper is partially based on the approach adopted by Audretsch, Carree and Thurik [4], considering two separate relationships between unemployment and entrepreneurship:

 i. a "refugee" effect by which unemployment "pushes" more people towards business ownership;
ii. a "Schumpeter" effect by which increasing rates entrepreneurship (business ownership) lead to greater levels of employment and economic growth.

For the purpose of the present paper focusing on the case of Portugal we deal only with the "Schumpeter" side of the relationship. Following Audretsch et al. [4], in order to test the hypothesis that an increase in entrepreneurial activity leads to a decrease in subsequent unemployment, the following equation is estimated:

$$U_t - U_{t-L} = a + b(E_{t-L} - E_{t-2L}) + c(U_{t-L} - U_{t-2L}) + e_t \qquad (1)$$

where U is the unemployment rate (unemployed per work force), E is the self-employment rate (business owners per work force) and e is a random coefficient. The index t refers to the year and L to the time lag.

If entrepreneurship has a positive influence on future employment, than an increase in business ownership should be followed by a decrease in unemployment; hence, the expected sign of the coefficient b is negative. The lagged endogenous variable is used on the right hand side to correct for reversed causality.[3]

Audretsch et al. [4] estimate Eq. (1) using the COMPENDIA data set containing data for 23 OECD countries over the period 1974 through 1998 (version 2000.1). Weighted least squares using the number of self-employed as weight variables were used in estimation. A lag of 8 years, yielding 46 data points, provided the results reported in column 1 of Table 2.

The relatively long lag structure is justified because the impact of entrepreneurship on employment is not instantaneous. Rather, a number of years are required for a firm to grow and have and hire new people. Coefficient b is less than zero and significant, implying a clear "Schumpeter" effect of entrepreneurship reducing unemployment. The negative effect of lagged unemployment on subsequent unemployment, $c<0$, is likely to be an indicator of cyclical effects related to the influence of policy measures. The autonomous change in the unemployment level, a, is not significant.

For the present analysis a new, extended COMPENDIA data set for the 1972–2002 period (version 2002.1) is used. In this case a 6-year lag, yielding 92 data points, performs better. Estimation results are presented in column 2 of Table 2. As opposed to the results from the earlier data set, there is now a significant, though small, positive autonomous effect, a.

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[3] The Granger [38] approach to the issue of causality – whether x causes y – is to examine how much of the current level of y can be explained by past values of y and then to see whether adding lagged values of x can improve the explanation. Thus, y is said to be Granger-caused by x if x helps in the prediction of y i.e. if the coefficients of the lagged x's are statistically significant. Two-way causation is frequently the case; x Granger causes y and y Granger causes x. It is important to note that the statement "x Granger causes y" does not imply that y is the effect or the result of x. Granger causality measures precedence and information content but does not by itself indicate causality in the more common use of the term.

Table 2
Regression results for Eq. (1)

	1	2
	COMPENDIA Data 2000.1	COMPENDIA Data 2002.1
	1974–1998	1972–2002
Time lag (years) – L	8	6
Number of observations	46	92
a	0.004 (1.0)	0.01 (3.3)
b	−0.78 (2.6)	−0.88 (3.4)
c	−0.18 (2.1)	−0.36 (3.5)

Values in parentheses are t-ratios.

The estimation confirms the importance of the role of entrepreneurship in bringing down unemployment in OECD countries. Similar results are shown in earlier studies [21,33,36,37]. To determine whether and to what extent the contribution of entrepreneurship to the reduction of unemployment in Portugal deviates from what is found in other developed nations, the present study makes use of the coefficients estimated for Eq. (1) using the more complete COMPENDIA data set (1972–2002) – as displayed in column 2 of Table 2. Using data for observed unemployment and business ownership rates for Portugal in the period 1972–2002, it is straightforward to calculate the estimated values of the residuals e_t for Portugal:

$$e_t = U_t - U_t^P \tag{2}$$

where U_t is the observed unemployment rate and U_t^P is the unemployment rate predicted by the model in Eq. (1).

The values obtained for the error terms tell us whether the model represented by Eq. (1) under-estimates or over-estimates the variation in unemployment for 1984–2002. Fig. 2 displays the estimated residuals while Fig. 3 presents the series of both "predicted" and observed unemployment rates for 1984–
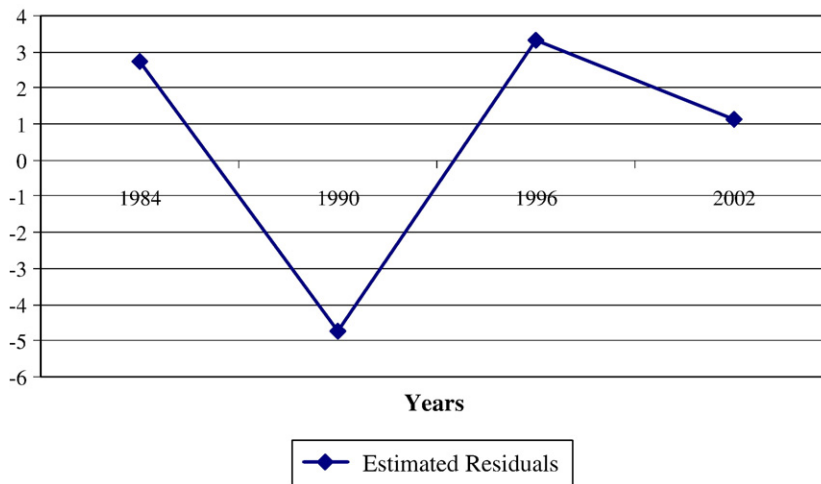

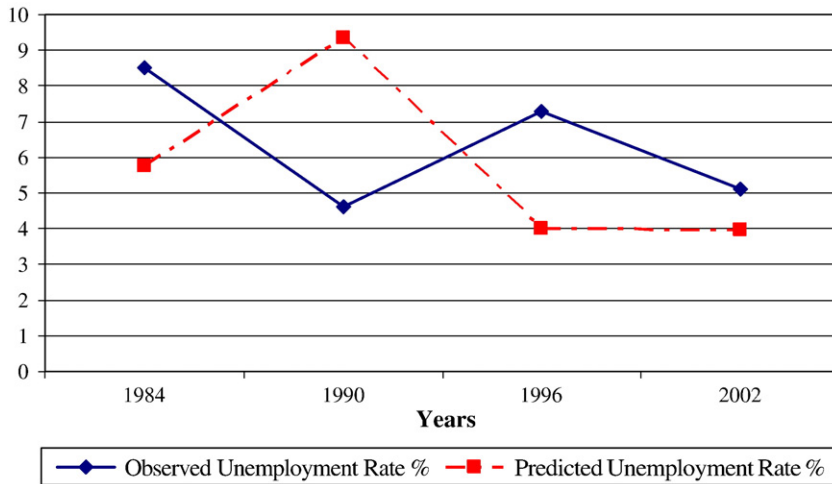Fig. 2. Estimated residuals for Portugal: 1984–2002.

Fig. 3. Observed and predicted unemployment rates in Portugal: 1984–2002.

2002, for observations in 1984, 1990, 1996 and 2004. It should be stressed that the estimated residuals appear to be unsystematic in that positive and negative values alternate. The estimated residuals are negative – indicating an over-estimation of the unemployment rate – for the period around 1990. For 1984, as well as for 1996 and 2002, the model provides lower predicted values for the unemployment rate than those actually observed, hence yielding positive estimated residuals.

Using the estimated coefficients for Eq. (1), predictions can be made regarding the level of unemployment in Portugal for 2008: $U_t - U_{t-L}$ equals 3.4 for $t = 2008$ and $L = 6$; this would imply that unemployment should rise in a period of six years starting in 2002 reaching about 8.5% in 2008. Evidently, this calculation depends upon the validity of Eq. (1) for Portugal. This requires extra care since Portugal is a relative outlier, meaning that other factors not included in the model probably play a role.

5. Discussion of the results

Fig. 3 allows for a comparison of predicted and observed unemployment rates for Portugal in the period 1984–2002. It seems clear that estimated errors are relatively high and unsystematic, thus making Portugal an outlier when compared to the OECD average.[4] Part of the discrepancies between real and predicted unemployment could be explained by the fact that the nature of entrepreneurship and the socio-economic environment in Portugal differ from those in most other OECD countries. However, the pattern of residuals suggests that other economic factors are likely to have played a significant part.

As was pointed out earlier, a large percentage of self-employment in Portugal in the early 1970s was founded on low productivity agriculture and very small retail businesses intended only for subsistence. While the structure of the Portuguese economy has changed significantly since, showing a significant

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[4] Estimated residuals for Spain are also relatively high – see Thurik and Verheul (2003) [39]. See Thurik (2003) [40] for an analysis of UK residuals in 1990 and 1998 using the older COMPENDIA 2000.1 dataset (1974–1998). See van Acht et al. [41] for an analysis of the Japanese case.

decrease in the weight of agriculture and an increase in the weight of services, very small firms still make up for a very large percentage of businesses. It can therefore be argued that what may be deemed as "subsistence entrepreneurship" has remained very significant in the Portuguese economy. This kind of entrepreneurship seems to be a feature of Southern European countries and has a significant impact on business ownership, thus providing an explanation as to why business ownership rates are persistently higher in countries such as Portugal, Italy and Greece than, for instance, in Central European and Scandinavian countries (see Table 1).

Subsistence entrepreneurship, however, is associated with insignificant firm growth rates and so has very little impact on employment. This suggests that the model estimated in the present paper should over-estimate the impact of increasing business ownership rates on decreasing unemployment; that is, one should expect observed unemployment to be consistently higher than predicted unemployment and so there should be a consistently positive estimated residual. Such hypothesis, however, does not hold in the present study for the period around 1990. While it can be argued that new businesses created since the mid-1970s may not display the same features of subsistence entrepreneurship (particularly as regards low productivity agriculture) and therefore should have a greater impact on unemployment reduction, the pattern of residuals suggests that other economic factors should be taken into account when explaining the model's performance.

As was also pointed out earlier, the first wave of cohesion funding which followed entry into the EU in 1996 was mostly directed at infra-structure enhancements and production capacity increases. This has generally led to an increase in capital intensity across the Portuguese economy. It is highly likely that scale increases by incumbents and the proliferation of public works contributed significantly to foster an unemployment rate below the levels predicted by the model. The dynamics provided by EU funding are likely to have provided a positive effect on employment that counteracted the lagged effect of a decrease in business ownership rates, thus explaining why the unemployment rate falls in the period from 1984 to 1990 instead of rising as predicted by the model.

The model's predictions switch from over-estimation to under-estimation of unemployment rates after 1990, coinciding with a period of receding growth in Europe, thus suggesting that the Portuguese economy is particularly susceptible to fluctuations in European business cycles, as would be expected from a small open economy integrated in a large regional market. Moreover, increasing monetary integration towards fixed exchange rates and a single currency constrained the government's ability to smooth out such fluctuations. It is therefore likely that the macroeconomic effects of receding growth in Europe counteracted the positive effect of increasing business ownership rates on employment.

From the outset of EU integration, business ownership rates in Portugal increased significantly (see Table 1). However, the impact of such increase on the unemployment rate was lower that predicted by the model, hence the positive residuals displayed by the model in 1996 and 2002 (see Fig. 2). A possible explanation for this is associated with adjustment costs that increase the time lag between new firm creation and its effects on growth and employment. Conceição et al. [42] have found evidence that there is a significant lag between the adoption of technological and organizational innovations and productivity growth for Portugal in the period since EU integration. It can be argued that the introduction of radical innovations may result in a slow and costly adjustment, leading to a temporary productivity slowdown and thus delaying growth.

Christensen and Rosenbloom [3] find that large firms are likely to face stronger resistance to technological change due to institutional rigidity and other factors so new entrants are more likely to

take the lead in introducing new innovations. If this has indeed been the case for Portugal in the period since EU integration, then new firms may have faced some of the adjustment costs proposed by Conceição et al. [42]; such costs may have extended the time lag for the effect of entrepreneurship on employment beyond what is standard in OECD countries, thus helping explain the model's under-estimation of unemployment rates from 1993–94 onwards (except for 2000). However, new firms created following EU entry are likely to display less of the characteristics associated with subsistence entrepreneurship. Moreover, it should be noted that adjustment costs associated with new technology adoption are likely to be more significant in industries where strong process innovation has occurred. Hence, for new small, labor intensive businesses that concentrate mostly on product innovations and niche markets the effect of adjustment costs on business growth is likely to be minimal.[5] The nature of the effects of adjustment costs to new technology adoption needs, therefore, a more qualified discussion.

From 1996 onwards, after a cycle of significant growth which started in the mid-1980s, the Portuguese business ownership rate started declining, likely as a result of both industry consolidation and the high rate of failure usually displayed by new start-ups (see [8]). As a result, the model predicts an increase in unemployment towards 2008. However, if adjustment costs have indeed increased the lag associated with the effect of entrepreneurship on employment, such predictions may turn out to be over-estimating the unemployment rate. Macroeconomic fluctuations should also play a significant role in determining the accuracy of the model's predictions.

6. Concluding remarks

It can be concluded that Portugal has been a relative outlier in regard to the effects of entrepreneurship on employment when compared with the OECD average. Although the nature of entrepreneurship may be different in the Portuguese case, due to a high proportion of "micro-businesses" created for subsistence which have little impact on growth and employment, this factor does not seem to be the primary reason for the observed discrepancies. The prevalence of subsistence entrepreneurship would suggest that the model should consistently over-estimate the negative effect of business ownership increases on unemployment, which does not happen. In fact, it can be argued that with EU integration and cohesion funding, new businesses should display less and less of the qualities of subsistence entrepreneurship.

The differences between observed levels of unemployment and those predicted for Portugal by the model based on OECD data seem to be mostly associated with two kinds of factors:

 i. macroeconomic fluctuations associated with European business cycles and the use of EU funding for productive capacity enhancement and, in particular, significant infra-structure investment by the government;
ii. adjustment costs to new technology adoption which lead to productivity slowdowns, thus increasing the time lag for the effect of entrepreneurship on employment beyond the OECD average.

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[5] This might help explain why a large percentage of business growth in, for instance, the shoe industry, has been accounted for by small businesses.

European politicians and representatives of social and institutional groups fear for a further rise of the already unacceptably high level of unemployment caused by the relentless efficiency and cost-cutting operations of the public and large business sectors. They hope that unemployment can be fought by stimulating entrepreneurship. This is probably true for various reasons.

First, stimulating entrepreneurship lifts the dependency on possibly sluggish and transient resources like scale, scope and experience, and intensifies the dependency on resources like adjustment and effectiveness. The latter resources are likely to be more robust against uncertainty and change than the former. Stimulating implies stimulating newness and diversity. Both are indispensable ingredients for prosperous modern economies. Diversity is the starting phase for selecting and selection breeds the next generation's products and markets.

Second, stimulation of entrepreneurship means stimulation of labor intensity and hence employment by definition (see [43]).

Third, stimulating entrepreneurship, in the form of new firms and in the form of new ideas and responsibilities implemented in existing organizations, is essential to knowledge-based economic activity because the potential value of new ideas and knowledge is inherently uncertain [17]. Existing firms will not pursue many new ideas because they have different agendas or simply do not recognize their potential value. If a new firm is not started to pursue such ideas they will simply remain untapped.

The present paper provides some empirical evidence supporting the views put forward above, and considers the specific position of Portugal amongst developed countries. The industrial transformation from a managed to an entrepreneurial economy varies widely across Western countries [22]. As the present paper shows, there is much to learn from confronting average OECD behavior with specific cases.

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