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Entrepreneurship and Labour Market Institutions

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Abstract

In this paper, we extend the theory of entrepreneurship to incorporate the effects of labour market institutions. Enterprise formation, wage determination, and optimal firm size are examined in an occupational choice model under two alternative wage-formation mechanisms. Our benchmark case with competitive labour markets shows that the entrepreneurship, firm size and the wage rate are all determined by the underlying technology. With union power in wage setting, standard results hold: firm size and the wage rate also depend on the relative bargaining power and unemployment compensation. There is a further implication: our main result indicates that, in the union model, the equilibrium rate of entrepreneurship decreases in the union's strength in wage setting.

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1 Introduction

In terms of their ability to create jobs and economic growth, many European economies have been disappointing for a fair amount of time. It is often suggested that the most useful way to approach this issue is to recognize that it is entrepreneurship that is the key engine in economic progress. Indeed, in any economy it is the entrepreneurs' innovation effort and risk-taking that create most of a nation's value-added, provide jobs and generate income, and offer a source of revenue to enable the government to carry out its social tasks. Enterprise formation arises from the occupational choice of individuals at the start of (or during) their active working life. In industrialized economies, only a relatively low although diverse, number of people choose entrepreneurship.[1] Although there is extensive literature on labour market performance, its interaction with enterprise formation has not been addressed. The current paper undertakes such a research task by bringing together the literature on labour market institutions and the occupational choice model of entrepreneurship.

In our paper, enterprise formation, wage determination, and optimal firm size are examined in an occupational choice model under two alternative wage formation mechanisms. In the benchmark case with competitive labour markets, we show that it is the underlying technology that determines the rate of entrepreneurship. In the union model in stead we show the equilibrium rate of entrepreneurship decreases in the union's strength in wage setting.

As entrepreneurship results from a risky occupational choice, it can hardly be understood without due consideration of risk-taking.[2] While the welfare state provides social risk insurance for workers in the form of unemployment compensation and other labour protection measures, insurance against business failure is out of the question in a market economy, and for good reason.[3]

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[1] Empirical data (OECD Labor Force Statistics) show that the rate of entrepreneurship (when measured in terms of entrepreneurs and those working on their own account as proportion of the total labor force), varies greatly between different economies. For example, in 1990, Norway (5.4%), Austria (5.6%) and Denmark (5.9%) were examples of countries with a below-average rate of entrepreneurship, while Belgium (11.4%), Ireland (10.2%), the UK (10.6%) and Australia (11.9%) were examples of countries with a much higher rate. Most central European countries fell between these two levels, while the Mediterranean countries typically have higher rates of entrepreneurship resulting from their high rate of self-employment. For an evaluation of the empirical studies, see Parker (2004).

[2] The view of entrepreneurs as primary risk-takers is deeply rooted in the Knightian tradition (Knight (1921)). The well-known complementary Schumpeterian view (cf. Schumpeter (1942)) depicts entrepreneurs as innovators, the heros of economic progress.

[3] Such risks show up in the unpredictability of entrepreneurial earnings representing the residual claim, in risky capital income, and in bankruptcy rates. The data reported by Eurostat (see Enterprises in Europe, Fourth Report (1996)) suggest that the failure rate

Entrepreneurial risks cannot be socialized for moral hazard reasons while labour protection measures serve a well-defined social purpose. Individuals with industry-specific human capital need protection in conditions in which markets do not provide such insurance. As showed by Booth (1996), an efficient outcome can be obtained even in conditions in which incumbent workers and firms are bargaining over wages and redundancy pay simultaneously.[4]

After ignoring it for a long period, the economic profession reintroduced entrepreneurial risk-bearing into the theory of the firm in the late 1970s. The economic underpinnings were analyzed in a few pioneering papers, including Lucas (1978), Kanbur (1979, 1981), Kihlstrom and Laffont (1979), and more recently Newman (1995), Fölster and Trofimov (1997), Blanchflower and Oswald (1998) and Boadway et al. (1998).[5] Lucas (1978) introduced the notion of ability differences to explain enterprise size distribution and growth in his work on Gibrat's law. Kihlstrom and Laffont (1979) on the other hand, suggested that less risk-averse agents would become entrepreneurs, and moreover that the lower the rate of risk aversion, the bigger the size of the firm. According to Kanbur (1979), entrepreneurs are self-selected without knowledge of their ability, while Boadway et al. (1998) suggest that differences in ability (to sell the product) give rise to different success probabilities. Empirical research caught up in the late 1980s, utilizing both longitudinal, time-series and cross-sectional data.[6] It is a frequently reported empirical regularity that finance and liquidity matter in the formation of new enterprises.[7] The rise (and subsequent fall) in venture capital finance in backing start-up firms in the 1990's led to a substantial increase in studies on issues related to entrepreneurship. It also came to be understood that informational asymmetries tend to facilitate the entry of low-quality projects, subsidized implicitly by high-quality projects (De Meza and Webb (1999)).

Entrepreneurship hinges upon a number of further mechanisms, including

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of new firms in the European Union is substantial in the early years of business. After the first year, 20% of new firms close down, 35% have disappeared within the first three years, and after five years, only 50% remain in the market, see also Geroski (1995).

[4]However, private contracts cannot undo policy-determined labor market regulation measures as the insurance elements created by those regulations raise the union bargaining power (Kanniainen and Vesala (2004)).

[5]The literature on self-employment up to the early 1990s is reviewed in de Wit (1993b).

[6]For a representative sample, see Blau (1987), Evans and Leighton (1989), Evans and Jovanovic (1989), Holtz-Eakin, Joulfaian and Rosen (1994a, 1994b), Van Praag and Van Ophem (1995), Lindh and Ohlsson (1996), Lindh and Ohlsson (1998), Blanchflower (2000) and Johansson (2000).

[7]Evans and Jovanovic (1989), Black, De Meza and Jeffreys (1993), De Wit (1993a), Holtz-Eakin, Joulfaian and Rosen (1994a,1994b), Blanchflower and Oswald (1997), Lindh and Ohlsson (1996), and Ilmakunnas and Topi (1999).

the quality of ideas and of entrepreneurs, and their willingness to provide effort, not to mention their preference for independence. Country-specific structural or cultural determinants may not be less important.[8] Previous studies have also established that the profit motive may not fully capture the reasons why some people become entrepreneurs.[9]

It has been recognized in the literature of industrial organization that diminishing returns determine the limits of industries and firm size. It has also been suggested that existing firms may undertake strategic pre-emptive actions in order to create entry barriers and block competition. Institutions also tend to adapt to new situations.[10] Moreover, unemployment may push some people toward establishing their own enterprises and furthermore many start-ups are initiated as spin-offs from existing firms. The development of entrepreneurship may thereby be a state-dependent cumulative process.

With its focus on the interaction between labour market institutions and entrepreneurship, our work differs from that reported in previous papers. After arriving at some results in the context of a competitive labour market, we explore the formation of enterprises in a unionized economy. Such a research task appears particularly relevant in the European context. With a few exceptions, the link between labour markets and entrepreneurship has not been analyzed.[11] We abstract from financial constraints and normalize entrepreneurial ability across individuals. Risks are assumed to be aggregate, and economy-wide, hence correlated. We thus focus on the market risks arising from business cycles. We assume that market entry is subject to costly ex ante commitment, which could be viewed as a cost of developing the idea or carrying out the necessary investments in human capital. It could also arise in the form of an asset risk, i.e. from the allocation of private assets to risky productive use. Ex post, such a cost is sunk and cannot be recouped in the case of default.[12]

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[8]For documented empirical evidence, see also Lindh and Ohlsson (1997) and Ilmakunnas and Kanniainen (2001).

[9]Hamilton (2000), Holtz-Eakin, Rosen and Weathers (2000), Gentry and Hubbard (2000).

[10]For instance, enterprises may be created by the contracting out of some activities. The boundaries of enterprises thus tend to be endogenous.

[11]Empirical findings of the cross-country studies conducted by Ilmakunnas and Kanniainen (2000) and Kanniainen and Vesala (2004) support the view that labor market institutions indeed tend to interact with enterprise formation.

[12]Given outside credit finance, contracts tend to impose substantial liability on start-up entrepreneurs, or given outside equity to entitle them to a fraction of residual claims. Entrepreneurs' invested wealth is thus subject to default risk, while non-entrepreneurial agents face no such risk. For a failing entrepreneur, there is also a psychological cost in terms of social stigma.

In our analysis, we build on the well-known right-to-manage model of a unionized economy.[13] We point out that one of the implications is that traditional labour union models are subject to a particular limitation as they take the production sector and industry size as exogenously given. They have overlooked the fact that forward-looking market entry, shaping the business dynamics, and labour demand, are not immune to the wage bargaining process in the post-entry stage.

Our analysis suggests a number of insights into enterprise formation. In the benchmark case of competitive labour markets when unions are not present, we show that the rate of entrepreneurship, the optimal firm size and the wage rate are all determined by the underlying technology. Given the sunk cost of entry and uninsurable business risk, risk-averse agents demand a risk premium when choosing a risky entrepreneurial occupation.[14] In the unionized economy, unions stabilize the wage rate across states. As usual, the negotiated wage positively depends on the union's bargaining power. We prove that a high bargained wage unambiguously reduces the level of enterprise formation. Our reasoning is as follows. With a higher wage rate, the incentive for individuals to abstain from entrepreneurship is enhanced and it becomes more attractive to enter the labour market instead. On the other hand, higher wages tend to decrease the probability of finding a job, thereby having a counter-effect, i.e. pushing people into entrepreneurship. Our analysis shows that it is the negative effect that dominates. There is more to it in that the average enterprise size is reduced and the optimal firm size depends adversely on the union power. Moreover, while the optimal size of a firm is independent of the state of market demand when labour markets are competitive, we show that this is not the case in the union model.

The paper is organized as follows. We introduce a model of a firm under market uncertainty, labour unions, and the occupational choice of individuals in section 2. In section 3, we first analyze the benchmark case of competitive labour markets in which unions do not exist, and then we formulate a model of wage bargaining with a firm's right to manage its labour force *ex post.* We examine the formation of enterprises in a unionized economy in section 4. Section 5 concludes the paper.

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[13]See, for instance, Oswald (1985), Farber (1986) and Booth (1995).

[14]We note that Fonseca, Lopez-Garcia and Pissarides (2001) have obtained a result that higher start-up costs discourage entrepreneurship. Their search theoretical model, however, has a different set-up as they abstract from risk-aversion.

2 The Model

Occupational choice The economy consists of identical risk-averse individuals with mass one. At the outset, the individuals face occupational choice between entrepreneurship (n) or joining the labour force, employed or unemployed ($1-n$). Enterprises will be run just by one individual.

Price uncertainty and entry cost The economy has one production sector. The product market is assumed to be competitive. The exogenous market price obtains the value $p = \underline{p}$ with probability λ and the value $p = \overline{p}$ with probability $1-\lambda$, $\underline{p} < \overline{p}$.[15] Each entrepreneur and therefore its labour thus face price risk. Entry of a start-up firm means that the entrepreneur commits to an entry cost, $k > 0$, assumed to be sunk. Each entrepreneur faces the risk of being unable to recoup the sunk cost k, uninsured by private risk markets or social insurance. Her liability cannot be limited by such devices. Her risk is non-diversifiable. Her labour faces unemployment risk. The labour is, however, assumed to be protected by social insurance in the form of unemployment compensation. As start-up entrepreneurs are subject to a strictly positive sunk cost, the risk adjusted expected return has to compensate for the failure risk.

Technology After commitment to an entry cost, each entrepreneur has access to production technology of constant elasticity variety

$$f(l) = l^\gamma, \qquad \gamma < 1, \tag{1}$$

where l is the number of workers in a firm, a measure of a firm size. The entrepreneur is the necessary input in hiring the labour and organizing the production; the output without him is zero. After resolution of price uncertainty, the profit of each firm is

$$\pi = pl^\gamma - wl, \tag{2}$$

where $p = \{\underline{p}, \overline{p}\}$, the realized price.

labour unions Given our assumption of homogenous labour, we can build on the standard labour union model.[16] The union has an objective of maximizing the expected utility of its members. The income of an employed

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[15]We simplify the demand side and assume perfectly elastic market demand as we focus on the supply side, i.e. formation of enterprises.

[16]Petrakis and Vlassis (2000) have shown that if the union's power is sufficiently high, universal right-to-manage bargaining emerges in equilibrium. Agell (2002) has introduced

member is the wage, w. The income of the unemployed, b, is exogenous, satisfying $b \leq w$, and is independent of the current variables. One interpretation of b is that it is an unemployment compensation. The utility of a member is of the constant elasticity type. The *ex post* utility of the union, conditional on observed price, is introduced in the form of a utilitarian variety

$$U = nlU(w) + (1 - n - nl)U(b) \tag{3}$$

$$= nlw^\rho + (1 - n - nl)b^\rho, \quad \rho < 1.$$

Our formulation differs from the standard union model in that the number of entrepreneurs is endogenous in (3). The market for entrepreneurship is open only once for the reasons of the sunk cost.[17]

The market price and the outcome of wage bargaining will dictate the optimal size of each firm, measured by employment. Workers face the risk of becoming unemployed. The employed and unemployed workers are assumed to be chosen randomly with probabilities $nl/(1-n)$ and $(1-n-nl)/(1-n)$.

Entry condition The expected utility of the entrepreneurial income, prior to price observation and adjusted for the sunk cost of entry, has to be sufficient to compensate for the expected utility of income earned as an employee. In other words, $E_p U[\pi - k] = E_p[U]$, or

$$E_p(\pi - k)^\rho = E_p(\frac{nl}{1-n}w^\rho + \frac{1-n-nl}{1-n}b^\rho). \tag{4}$$

This condition determines the equilibrium rate of entrepreneurship (entry), n. The timing of our model is as follows. At time $t = 0$, individuals make their occupational choice. Entrepreneurs commit to an entry cost, $k > 0$. After entry, the firms and the union observe the price. At time $t = 1$, the wage rate w is negotiated. At time $t = 2$, the entrepreneurs choose their labour input (firm size), l, in the light of their right to manage.

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a different union model, arguing that with heterogenous labor, insitutionalized wage compression operates as a welfare-enhancing device, providing social insurance, albeit at a cost of unemployment for those who hold the bad jobs. He focused on labor income risk, abstracting from business risk, which, however, ougth to be the cause of the employment risk of workers. Moreover, his model abstracted from aggregate risks, overstating a union's ability to provide an insurance for its members. We abstract from unions as an insurance device. In the current approach with aggregate risks, its potential role as an insurance device is limited, as the social insurance is provided by the government.

[17]One can interpret this to mean that once the labor contracts have been settled, those who become unemployed have the option of self-employment outside the labor market. The outside income b can then be alternatively viewed as income from self-employment.

3 The Analysis of labour Market Institutions and Entrepreneurship

3.1 Entry under Competitive labour Markets

Consider first the case of competitive labour markets with no unions as a benchmark. We do this for two reasons. First, we can examine the role of technology. Second, we can see the role of the sunk cost in terms of profit premium. As the logic of a competitive labour market is very different from the bargaining model with a union, the reader should bear in mind that the latter model cannot be obtained as a limiting case by making the union bargaining power approach zero in the union model to be introduced in the next section.

Entry is irreversible but employment decisions are made after resolution of price uncertainty. There is no role for unemployment compensation because, by definition, there will be no unemployment. Market wage adjusts to provide full employment. Such an economic structure raises, of course, tricky welfare issues. Risk-averse workers are willing to pay for an insurance against income risk. Risk averse entrepreneurs may not have the ability to provide it. With large-scale corporations with diversified ownership, and access to financial contracts, insurance would become available as part of labour contracts adjusted for an insurance premium. With homogenous labour, tax on labour income could not be used to provide an insurance. Such thoughts point to the complexity of normative issues. Here, we restrict our analysis to positive issues, only. We establish some key results in a most simple model. The competitive world is not introduced to provide a yardstick in terms of a welfare analysis but to provide results related to technology and risk-aversion. The technology and risk-related mechanisms will then below be spiced by the union effects.

Assuming that the utility of agents is of constant exponential variety, the indifference condition $E_p U[\pi - k] = E_p U[w]$ reads as

$$E_p(pl^\gamma - wl - k)^\rho = E_p(w)^\rho.$$

Each firm is a price-taker in product and labour markets and chooses its employment according to the marginal productivity condition $l_C = (\frac{w_C}{p\gamma})^\phi$, where $\phi = \frac{1}{\gamma - 1} < 0$ and where p is either $\underline{p}$ or $\overline{p}$. In the labour market, labour supply has to match its demand in the aggregate. The labour market equilibrium thus requires $1 - n = nl_C = n(\frac{w_C}{p\gamma})^\phi$. The equilibrium wage is then found as a function of entry and market price

$$w_C(n, p) = p\gamma[\frac{1 - n}{n}]^{\frac{1}{\phi}}. \tag{5}$$

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with the *ex post* relationship $\partial w_C/\partial n > 0$. Thus, in a competitive labour market, the equilibrium wage is positively related to the number of enterprises. Moreover, the optimal size of each enterprise, measured in terms of hired labour, is related in a simple way to market entry,

$$l_C = (1-n)/n \qquad (6)$$

with $\partial l_C/\partial n < 0$.

It is the property of a competitive labour market that there is full job security. The optimal size of each firm is independent of the state of market demand. This will be different in the union model. The wage will absorb a substantial part of the price risk. However, irreversible entry is risky for an entrepreneur whose income is the residual. In the expected value sense, it has to be sufficient to compensate for the cost of entry, k. It is illuminating to solve first for the equilibrium entry in the absence of entry cost, $k = 0$, to see the role paid by the technology. We obtain a clear-cut result:

Proposition 1 *Under a competitive labour market and in the absence of entry cost, entrepreneurship is determined by the degree of returns to scale, $n = 1 - \gamma$.*

Proof. Inserting the solutions for w_C and l_C into the indifference condition $E_p(pl^\gamma - wl - k)^\rho = E_p(w)^\rho$. gives the result. ∎

Several important conclusions arise from this finding. First, the incentive for market entry is inversely related to the degree of diminishing returns to scale. Under slowly decreasing returns, there is less room for inframarginal profits, suggesting that there are fewer enterprises but that they all operate on a larger scale. Second, in competitive labour markets with costless entry, there is no risk premium for an entrepreneur who shares the income risk with hired labour on equal basis. Third, also labour demand is fully determined by the technology. Insert $n = 1 - \gamma$ in (6) to obtain $l_C = \gamma/(1 - \gamma)$. Fourth, the state dependent wage rate is determined both by the technology and the realized price, $w_C(p, \gamma) = p\gamma[\frac{\gamma}{1-\gamma}]^{\gamma-1}$.[18]

Suppose now in stead that entry requires costly *ex ante* commitment, $k > 0$. Such a cost is avoided by entering labour force but it has to be compensated to a risk-taking entrepreneur. To examine, the right-hand side of $E_p(w)^\rho = E_p[p\gamma]^\rho(\frac{1-n}{n})^{(\gamma-1)\rho}$ is independent of k. Thus one must have $\partial E_p(pl^\gamma - wl - k)^\rho/\partial k = \partial E_p[p(1-\gamma)(\frac{1-n}{n})^\gamma - k]^\rho/\partial k = 0$ from the left-hand

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[18]We notice that the link between the equilibrium rate of entrepreneurhip and technology is explicit in Kanbur (1979). Interestingly, our result is independent of the degree of risk version.

side, which is possible only if $\partial n / \partial k < 0$. Entry cost thus reduces the number of entering firms, $n < 1 - \gamma$. In order to have an incentive to enter, a firm requires a premium over the less risky wage income.

Lemma 2 *Entry cost generates a positive risk premium for entering enterprises, thus reducing the number of entering firms.*

Proof. The result follows from reduced enterprise formation being reflected in a lower wage rate, since from equation (5) we see that $-(\partial w_C / \partial n) < 0$. Consequently, the expected profit of each potential entrepreneur is increased, generating a positive risk premium. $\blacksquare$

3.2 Wage Bargaining: The Right to Manage

The technological and risk-related effects on incentive of becoming an entrepreneur will now be augmented by the effects of unionized wage setting. We assume that the union and the employers share the bargaining power. The union's bargaining power is $\theta < 1$ and the firms' bargaining power is $1 - \theta$, respectively. The fall-back value of the union is taken to be utility when all $1 - n$ workers are unemployed, being eligible to unemployment benefit b. The fall-back value of a firm, in turn, is assumed to be zero production and thus zero profit. That is, we follow the stadard assumptions in the labour union models.

The model is solved by backward induction. In the final stage, the size of each firm after resolution of price uncertainty and wage negotiation is $l = (\frac{w}{p\gamma})^\phi$. Due to diminishing returns, firms have access to inframarginal profits. It is convenient to rewrite the profit function as $\pi(w) = l(w)w(\frac{1}{\gamma} - 1) > 0$ where, one should remember, $\partial l / \partial w < 0$. The wage rate is determined in the previous stage through bargaining. When entering the market, a potential entrepreneur is interested in the expected utility of profit, see the indifference condition (4). It is this indifference condition in the initial stage where the diminishing marginal utility of consumption plays its role. However, it is the actual profit in the *post-entry* stage which the entrepreneurs are concerned with when participating in the wage negotiation. Thus, the bargaining is modeled as

$$\max_{w_N} \Gamma = [nl(w_N^\rho - b^\rho) + (1-n)b^\rho - (1-n)b^\rho]^\theta [n\pi]^{1-\theta} \qquad (7)$$

subject to $l \in \arg\max \pi = pl^\gamma - w_N l$. As entry rate n is bygone when bargaining takes place, the maximization problem in (7) is equivalent to

$$\max_{w_N} \Gamma = u^\theta \pi^{1-\theta} \quad \text{s.t.} \quad l \in \arg\max \ \pi = pl^\gamma - w_N l.$$

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We have denoted $u = nl(w_N^\rho - b^\rho)$. With positive inframarginal profits ($\pi > 0$), the first-order condition is given by the weighted average of the elasticities of the workers' utility and the firms' profit with respect to the bargaining wage:[19]

$$u^\theta \pi^{1-\theta}[\theta(\frac{u_w}{u}) + (1-\theta)(\frac{\pi_w}{\pi})] = 0. \tag{8}$$

In solving for the resulting wage rate, we will make use of the fact that with inframarginal profits, this condition holds only when the expression within the square brackets is equal to zero. Notice also that the firm's labour demand is the firm's optimal choice, and thus, by the envelope theorem $\pi_w = -l$. Substituting in (8),

$$\theta \frac{[n\frac{\partial l}{\partial w_N}(w_N^\rho - b^\rho) + nl\rho w_N^{\rho-1}]}{[nl(w_N^\rho - b^\rho)]} = (1-\theta)(\frac{l}{\pi}).$$

Since $l = (\frac{w_N}{p\gamma})^\phi$ and $\frac{\partial l}{\partial w_N} = \phi(\frac{w_N}{p\gamma})^{\phi-1}\frac{1}{p\gamma}$, and eliminating π, we obtain after some manipulation the wage rate

$$w_N = b\left[\frac{\gamma + \theta(1-\gamma)}{\gamma + \theta(1-\gamma-\rho+\rho\gamma)}\right]^{\frac{1}{\rho}}. \tag{9}$$

It is important to notice that in the union model, the wage rate w_N does not depend on the realized price. This should be contrasted to the wage rate in the competitive case,

$$w_C(p,\gamma) = p\gamma[\frac{\gamma}{1-\gamma}]^{\gamma-1},$$

from above. Otherwise, we see two standard results of the labour union literature holding here. In the extreme case where the union's bargaining power is zero, the wage agreed upon equals the exogenous unemployment compensation, $w_N(\theta = 0) = b$. The other extreme case is where a union is strong in the sense that it does not need to negotiate about the wage but is able to impose it unilaterally as a market monopolist. The monopoly union chooses w_N so as to maximize its objective function anticipating the employment choice by the enterprises. By inserting $\theta = 1$ in (9), $w_N(\theta = 1) = b\left[\frac{1}{1+\rho(\gamma-1)}\right]^{\frac{1}{\rho}}$. The term in square brackets, $\frac{1}{1+\rho(\gamma-1)} > 1$, since $\gamma < 1$ and thus $w_N(\theta = 1) > b$. By differentiating (9) with respect to θ, we obtain $\frac{\partial w_N}{\partial \theta} = -\frac{(-1+\gamma)\gamma\rho}{(\gamma+\theta-\gamma\theta+(-1+\gamma)\theta\rho)^2} > 0$ for all parameter values. Thus, the negotiated wage rate is increasing in the union's bargaining power. This is a standard result. After substituting in w_N, the labour demand is given by

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[19]We assume that the second-order condition holds.

$$l = \left[\frac{b}{p\gamma} \left(\frac{\theta + \gamma(1-\theta)}{\theta + \gamma(1-\theta) - \rho\theta(1-\gamma)} \right)^{\frac{1}{\rho}} \right]^{\frac{1}{\gamma-1}}.$$

In contrast to the competitive labour market model, the labour demand in the union model is state-dependent. Finally, we notice that in the union model, the number of firms in the market, n, does not influence the outcome of bargaining nor the labour demand.

4 Enterprise Formation in a Unionized Economy

We now turn to examine how the strength of the union is reflected in the formation of enterprises and their optimal size. This can be analyzed by examining $\partial n / \partial \theta$. Changing bargaining power of the union shapes the incentives of the individuals when making their occupational choices.

The fact that the union has bargaining power suggests that wages tend to be pushed up, leading to fewer jobs available. Naturally, the union incentives are affected not only by its bargaining power but also by the access of union members to unemployment compensation. In the initial stage of our model, the *ex ante* indifference condition (4) requires

$$E_p(\pi_N - k)^\rho = \lambda[\frac{n\underline{l}}{1-n}w_N^\rho + \frac{1-n-n\underline{l}}{1-n}b^\rho]+$$

$$(1-\lambda)[\frac{n\bar{l}}{1-n}w_N^\rho + \frac{1-n-n\bar{l}}{1-n}b^\rho].$$

Evaluating both sides, we can rewrite

$$\lambda[\pi(w_N,\theta) - k]^\rho + (1-\lambda)[\pi(w_N,\theta) - k]^\rho \qquad (10)$$
$$= (w_N^\rho - b^\rho)\frac{n}{1-n}[\lambda\underline{l} + (1-\lambda)\bar{l}] + b^\rho.$$

where $\underline{l} = l(\underline{p})$ and $\bar{l} = l(\bar{p})$ are the state-dependent employments. We now substitute the wage rate from equation (9). The above condition then states the equilibrium rate of entrepreneurs, n_N, as a function of exogenous parameters only. In principle, one should be able to solve it for n_N. However, the indifference condition is non-linear in n_N, the rate of entrepreneurship. Therefore, no closed-form solution is available. However, we are able to produce a clear-cut analytic result.

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We proceed in two steps. We have already reached the conclusion that $\partial w_N/\partial\theta > 0$,and now we analyze how the wage rate affects the market entry, the second link in the process. We use the indifference condition (10) to examine dn/dw_N.

We first notice that the condition (10) states an equality between two value functions, one for an individual as a potential entrepreneur and one for an individual as a potential employee. Since the firms and unions are price-takers, the left-hand side is independent of the number of entering enterprises. Totally differentiating (10), we obtain

$$\frac{dn_N}{dw_N} = \frac{E_w[\pi_N] - E_w[U_N]}{E_n[U_N]}. \tag{11}$$

We can now state our main result

Proposition 3 *An increase in the bargained wage rate unambiguously leads to reduced enterprise formation.*

Proof. To evaluate the sign of (11), note first that the marginal entrepreneur understands that an increase in the wage cost reduces expected profit,

$$E_w[\pi_N] = -\lambda\underline{l}\rho(\underline{\pi} - k)^{\rho-1} - (1 - \lambda)\overline{l}\rho(\overline{\pi} - k)^{\rho-1} < 0.$$

Here we have made use of the envelope theorem, giving $d\pi/dw = -l$. An increased number of enterprises is beneficial to workers, since the probability of obtaining a job both in the good and bad states is higher:

$$E_n[U_N] = [\lambda\underline{l} + (1 - \lambda)\overline{l}]\frac{N}{(1 - n)^2}(w_N^\rho - b^\rho) > 0.$$

It remains to analyze the impact of a higher wage on the expected utility of an employed worker,

$$\begin{aligned} E_w[U_N] &= \frac{n}{1 - n}\lambda[\frac{\partial\underline{l}}{\partial w}(w_N^\rho - b^\rho) + \underline{l}\rho w_N^{\rho-1}] + \\ &\quad \frac{n}{1 - n}(1 - \lambda)[\frac{\partial\overline{l}}{\partial w}(w_N^\rho - b^\rho) + \overline{l}\rho w_N^{\rho-1}]. \end{aligned}$$

There are two offsetting mechanisms affecting the worker's utility. The second terms within both square brackets are positive: for any given rate of entry and any given size of enterprise, a higher wage raises the utility of each employee. The first terms are negative because a higher wage leads to a smaller firm size. It is, however, the positive effect which must dominate, making $E_w[U_N] \geq 0$. To see this, it is helpful to consider first the case of a

monopoly union with $\theta = 1$. By its first-order condition, it certainly holds that $E_w[U_N] = 0$, since the monopoly union has chosen the wage unilaterally to maximize its expected utility. Then, by the logic of the model, any union with a lower bargaining power, $\theta < 1$, has to face a *lower* wage, $w_N < w_M$, where M refers to the monopoly union. The implication is that for such a union it must hold that $E_w[U_N] > 0$. This completes the proof. ■

The current section has derived the equilibrium rate of entrepreneurship and its dependence on the union power. What is the intuition? What determines the limit to entrepreneurship? In an unionized economy, any potential entrepreneur (or individual) is assumed to be forward-looking, anticipating the forthcoming strategic bargaining position. By pushing up the wage rate, union actions tend to enhance incentives for individuals to abstain from entrepreneurship and entering the labour market instead. On the other hand, higher wages tend to decrease the probability of finding a job, thereby having a counter effect, i.e. pushing people to entrepreneurship. Our proposition 3 proves that it is the negative effect which dominates.

5   Final Remarks

Our model has considered entrepreneurship under various labour market institutions. The union effects on entrepreneurship, wage determination, and the optimal firm size have been analyzed in an occupational choice model. In the benchmark case with competitive labour markets, entrepreneurship is determined by the underlying technology. Entry cost generates a risk premium on entrepreneurship. With union power in wage bargaining, our main result is that the equilibrium rate of entrepreneurship is reduced and so is the average size of enterprises. The robustness of the results could be examined by extending the model in various directions. For example, one could introduce a different assumption of entering entrepreneurs. Having heteregenous entrepreneurial abilities would extend the model in the direction of firm-specific risks. We conjecture, however, that as long as a union's strategy results in wages exceeding the competitive ones, the results will hold. Note, however, that except for having a short discussion, we have abstained from any normative statements. Yet, as the European disease is often related to the way its labour markets operate, we believe that our results provide some additional insights on this discussion.

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