



# Production complementarities and flexibility in a model of entrepreneurship



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## ABSTRACT

The focus of this paper is the flexibility in working hours as a motive for entrepreneurship. The model exhibits inflexibilities for workers and entrepreneurs, which arise due to complementarities in production. In addition, it allows for volatile value of leisure to make flexibility in hours desirable. Differences in occupation-specific flexibility, disciplined with the observed patterns in hours (level, persistence, dispersion) and income (persistence, dispersion), can explain relatively low income levels of entrepreneurs in the US and the occupation-specific distributions of working hours and income. Policy relevance of the model features is discussed using experiments of workweek restrictions and income taxation.

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## 1. Introduction

Factors affecting the selection into entrepreneurship determine the observed characteristics of firm owners, hence, change the productivity and output patterns of their firms (e.g. levels, volatility). Moreover, entrepreneurs are potential workers and this gives a direct link between entrepreneurship and the size of the labor force available for employment. Accordingly, identifying the motives for entrepreneurship and capturing the economic mechanisms underlying these motives are important for studying the firm-level and aggregate productivity patterns, as well as the aggregate labor in the economy.

Standard macroeconomic theory on entrepreneurship treats the choice between salaried work and entrepreneurship mainly as a matter of productivity. In the seminal work by Lucas (1978), agents consider their relative ability of running a firm over being a worker and they become entrepreneurs if its pecuniary benefits are high enough. This model has been improved with features such as financial constraints and volatility in occupation-specific ability to better match the patterns observed in the data including the wealth and income distribution (Buera and Shin, 2013; Cagetti and de Nardi, 2006; Midrigan and Xu, 2014).

Nevertheless, this line of research neglects the observed income differentials between entrepreneurs and workers. Hamilton (2000) shows that entrepreneurs generate less income than comparable workers. This is also true for any tenure in business, so that switching to salaried work at any time of entrepreneurship would make most business owners better off income-wise. This feature in the data has brought attention to the non-pecuniary benefits associated with entrepreneurship. For instance, Hurst and Pugsley (2011) use survey data on business owners to show that the majority of entrepreneurs list non-pecuniary reasons such as flexible hours or preferring to be their own boss for starting their businesses. In another recent paper, Pugsley (2011) uses an innate preference for entrepreneurship to explain the observed income differentials.

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Recognizing the role of non-pecuniary motives in entrepreneurship is important, but a structural model that highlights the mechanisms accounting for such motives is still missing. In turn, this has prevented the literature from disciplining the explanations with the observed micro patterns other than the income differentials.

My objective in this paper is to fill this gap by focusing on the flexible hours motive for entrepreneurship, as this is one motive that can potentially be quantified using data on hours by workers and entrepreneurs. The empirical evidence provided here documents that the patterns of hours of entrepreneurs are different from those of workers. In the cross-section, working hours are more disperse for entrepreneurs than they are for workers. The distribution of changes in hours are more concentrated around zero for workers than they are for entrepreneurs. Moreover, workers with hours close to the usual hours in their sectors tend to earn more per hour, which is a pattern that seems missing for entrepreneurs.

Departing from the highlighted facts, the question that follows is: Is the flexible hours motive, disciplined with the observed occupation-specific patterns in hours (level, persistence, dispersion) and income (persistence, dispersion), strong enough to generate the observed differentials in income levels? In order to answer this question, I add two features to a standard entrepreneurship model. First feature is the shocks to the value of leisure in a fashion used in the literature in various contexts.<sup>1</sup> Defining flexibility as the ability to change hours without sacrificing hourly income, volatile value of leisure creates a preference for flexibility. The second is a labor aggregation technology that exhibits complementarities between hours of workers. This novel feature makes workers more productive if their hours are similar to each other. Hence, it makes wages depend on the hours of work and get particularly low for those working too little or too much, consistently with the observed hump-shaped pattern of workers' hourly income across their working hours. As a result of such an endogenous cost of deviating from the "usual" hours in the economy, the preference for flexibility manifests itself as a preference for entrepreneurship.

The Survey of Income and Program Participation (SIPP) is used to calibrate the model for the US. The model can generate the income differentials between workers and entrepreneurs. Moreover it gives a good fit for other untargeted moments such as income and hours distribution among entrepreneurs and workers.

In order to show the quantitative importance of the key features, I compare the model's performance with that of two standard alternatives that ignore worker complementarity and value of leisure volatility. The complete flexibility arising in the absence of complementarities creates a dispersion in workers' hours that is more than 50 percent larger than the data. The resulting lack of the flexibility motive for entrepreneurship generates counterfactually high average income for entrepreneurs. On the other hand, omitting the value of leisure shocks takes out an important source of hours variation from the model. The productivity shocks alone, calibrated to match the income dispersion for workers and entrepreneurs, can only generate half of the dispersion observed in hours for these occupations.

The benchmark economy has many workers finding it hard to keep up with the long hours of their peers. There are also individuals that have become entrepreneurs only to avoid the working hours that are too long for their value of leisure. Accordingly, policies leading to modest reductions in the working hours can help these people. This paper gives two examples, workweek restrictions and labor income taxation, to elaborate this quantitatively.

The inability of workers to choose their working hours without sacrificing hourly income has been documented empirically. [Dickens and Lundberg \(1993\)](#) use the Current Population Survey to show that 35 percent of male workers in the US would like to change their hours, and 28 percent would like to increase their hours given hourly wage. [Stewart and Swaffield \(1997\)](#) and [Boheim and Taylor \(2004\)](#) reach similar conclusions using datasets on UK workers. [Altonji and Paxson \(1988\)](#) show that there is a premium for working an undesirable amount of hours. They argue that firms have strong preferences for hours worked and that there is a fixed hours phenomenon. [Aaronson and French \(2004\)](#) use the social security rules in the US to identify the link between hours and hourly wage. They find that there is a significant wage penalty for switching to part time work from full time work for men. Moreover, they argue that the models ignoring the nonlinear link between hours and wages are bound to underestimate the effects of income taxation on labor supply. [Rogerson \(2011\)](#) surveys the literature documenting the inflexibilities in labor supply, as well as the studies that exogenously introduce these inflexibilities to a standard labor supply model. He also extends a standard model by an exogenously given non-linear wage rate. The way inflexibilities in hours arise here is close to this feature of [Rogerson \(2011\)](#). Importantly, my model presents an underlying mechanism to generate the non-linear wage scheme.

The paper is organized as follows. [Section 2](#) provides evidence from the US suggesting that volatile preferences and inflexible hours can be playing a role in individuals' decision of entrepreneurship. [Section 3](#) introduces the benchmark model. [Section 4](#) explains the calibration and [Section 5](#) presents the main results. [Section 6](#) discusses the role of the main features of the benchmark model and their relevance for policy. [Section 7](#) concludes.

<sup>1</sup> For instance, [Erosa et al. \(2016\)](#) show that such heterogeneities in the value of leisure are key in understanding the labor supply elasticities of workers. [Aaronson and French \(2004\)](#) also use value of leisure shocks to capture the observed variations for workers.

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