Journal of Development Economics 107 (2014) 175–191

Contents lists available at ScienceDirect

Journal of Development Economics

journal homepage: www.elsevier.com/locate/devec

A structural econometric analysis of the informal sector heterogeneity ☆

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ARTICLE INFO

Article history:
Received 21 November 2012
Received in revised form 28 September 2013
Accepted 3 December 2013

JEL classification:
O12
O17
C51
C52
C54

Keywords:
Occupational choice
Financial constraints
Entrepreneurial skills
Maximum likelihood estimation
Informal economy
Nonparametric estimation
Specification testing

ABSTRACT

Understanding the informal sector – that represents about 60–90% of urban employment in developing countries – has a significant importance for any strategy and policy interventions aiming to alleviate poverty and improve welfare. I formulate and estimate a model of entrepreneurial choice to address the heterogeneity in occupations and earnings observed within the informal sector. I test the implications of the model with reduced form and nonparametric techniques, and use a structural econometric approach to empirically identify occupational patterns and earnings using data from the Cameroon informal sector. The empirical validity of the structural estimates is tested and the estimated model is used in counterfactual policy simulations to show how microfinance and business training programs can strengthen the efficiency of the informal sector and substantially improve its earning potential.

1. Introduction

In developing countries, the informal sector has an overwhelming importance for at least three reasons. First, it is a response to poverty and unemployment; informal entrepreneurs drive job formation through small-business creation.[1] Second, it is considered an incubator for business potential and a stepping stone for accessibility and graduation to the formal economy (ILO, 2002). Third, it absorbs the majority of the workforce; about 60–90% of the overall employment is in the informal sector (ILO, 2009; UN-Habitat, 2006). However, in spite of involving so much workforce the informal sector produces only 10–40% of the gross national product, essentially because informal subsistence activities characterized by labor-intensive and low-income generating businesses predominate this economy. In fact, a typical feature of the informal sector, which is increasingly referred to in the literature as "upper" and "lower" tiers segmentation, is that it includes both urban poor people, who depend on informal subsistence activities for their livelihood, as well as relatively higher-income people most of whom are micro-entrepreneurs running small or medium size enterprises that use capital and hire labor (Fields, 1990). Understanding this heterogeneity that characterizes the informal sector therefore has significant implications for any strategy and policy interventions aiming to alleviate poverty and improve economic welfare.

This paper contributes to this objective by providing an econometric analysis of the heterogeneity observed in the informal sector. I formulate and estimate a structural model of occupational choice where informal sector agents choose between subsistence activity and entrepreneurship, and their decision-making process depends on their entrepreneurial skills as well as their access to credit. I test the implications of the model with reduced form and nonparametric techniques, and use a structural econometric approach to empirically identify the relationship among skills, initial wealth distribution, and occupational patterns and earnings using data from the Cameroon informal sector. The empirical validity of the structural estimates is tested using the Lavergne and Nguimkeu (2011) specification test, and the estimated model is used in a counterfactual policy simulation to show how microfinance and business training programs can strengthen the efficiency of the informal sector and substantially improve its earning potential.

☆ I gratefully acknowledge financial support from the Social Science and Humanities Research Council of Canada (SSHRC). I thank the National Institute of Statistics of Cameroon for making the data available to me for this study. Comments from Emmanuelle Auriol, Jean-Paul Azam and participants of the CEA and WEAI conferences are gratefully acknowledged. I am much indebted to Pascal Lavergne and Alexander Karaivanov for intensive discussions and advices. Finally, the comments and suggestions of two anonymous referees helped to greatly improve the paper.

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[1] More than 90% of new jobs created between 1990 and 1994 in Africa were in the informal sector (Kuchta-Helbling, 2000).

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http://dx.doi.org/10.1016/j.jdeveco.2013.12.001

The model used to approximate individual behavior is an extension of a widely used empirical specification that is featured in Evans and Jovanovic (1989). Each agent compares the expected gain he or she would obtain from subsistence activity to the expected profit accruing from running a firm. An individual in the subsistence activity receives a fixed income while an entrepreneur establishes a firm with capital investment and realizes profit from a decreasing-returns-to-scale production technology. Entrepreneurship promises higher expected earnings, but requires higher skills and higher starting capital that can be supplemented by borrowing. However, because of credit market imperfection, borrowing is exogenously limited to a fixed multiple of initial asset. Initial wealth therefore plays the role of collateral and is required by financial institutions as a strategy to reduce default. Thus low-wealth entrepreneurs may be constrained in their investment and some potential entrepreneurs may be unable to borrow to finance their projects in spite of having a good entrepreneurial idea. The main implication of the model is that entrepreneurial choice and entrepreneurial earnings are positively related not only to skills but also to initial wealth. In order words, if profitable entrepreneurial activities (entrepreneurship) require getting a certain level of initial wealth to use as collateral in the capital market, poorly endowed individuals will not engage in such activities. They will rather remain in subsistence activities that require no capital, so that, the higher the share of initially poor people in the economy, the bigger the size of the subsistence segment.

The main focus of this work is to use data from Cameroon to address the heterogeneity observed in the informal sector whose stylized facts are comparable to those produced by the theoretical model, and then use the estimated model to formulate and perform welfare analysis that allow to quantify the impact of relevant policies. The structural parameters of the model are estimated using maximum likelihood estimation technique. The likelihood function is constructed by matching the expected probability of becoming a micro-entrepreneur generated by the theoretical model (expressed as a function of initial wealth and other individual and market characteristics) with the corresponding household occupational status observed in the data. The econometric analysis is performed for the whole sample, as well as for various data stratifications including urban, rural and metropolitan areas. The model implications are also tested through reduced form estimation (including probit and quantile regressions) that make use of multivariate controls as well as non-parametric estimation that does not impose any a priori structure to the relationship among the variables. I use these techniques not only to check the robustness of the structural findings but also to examine to what extend other factors not featured in the theoretical model may influence entrepreneurial choice. A validity check to determine how close the specified model is to the data is also performed by applying the Lavergne and Nguimkeu (2011) model specification test.

The empirical analysis uses data from a cross-sectional sample of households of Cameroon stemming from the 2005 National Survey on Employment and Informal Sector (EESI). This survey is a two-phase nationwide operation conducted by the National Institute of Statistics in partnership with the World Bank. The first phase collects socio-demographic and employment data while the second phase interviews a representative subsample of informal production units identified during the first phase. The methodology of the EESI is therefore similar to that of Phases 1 and 2 of the well known "1-2-3 surveys" in Central and West Africa. Only data from Phase 1 are used here. The estimation results reveal that more than 80% of micro-entrepreneurs are credit constrained and that these constraints are the main source of the differences in informal enterprises returns, which is consistent with previous results in the literature. More interestingly, they reveal that credit constraints also affect people's occupational choices and explain the preponderance of massive subsistence activities characterized by low earnings that coexist with micro-enterprises. Observable skill such as education also appears to be a key determinant of occupational patterns and entrepreneurial earnings in the informal sector. This result has been already emphasized in Nguetse (2009), who estimated returns to education in the Cameroon informal sector using this same dataset. These findings then suggest that appropriate financing schemes as well as skills enhancement strategies can improve welfare by improving the shape of allocation of talents across occupations and raising the earning potential of the informal sector. To confirm this intuition, I use the structural estimates to perform two counterfactual policy experiments. The first experiment evaluates the impact of a micro-lending program using an approach similar to Buera et al. (2011) while the other quantifies the impact of a business training program as explained in McKenzie and Woodruff (2012). The results show that by allowing individuals to borrow up to three times the value of the average household wealth the proportion of micro-entrepreneurs can substantially increase by up to 9%, representing twice as much micro-entrepreneurs in the economy, while the average earnings of the overall informal sector can increase by more than 30%. Likewise, a training program that increases the average entrepreneurial ability by up to 15% produces similar results on entrepreneurship. Moreover, these experiments show that the heterogeneity of returns among informal enterprises stemming from differences in levels of starting capital and skills can be considerably lowered.

Several other studies have addressed the heterogeneity observed in the informal sector and the related differences in occupations and earnings. A growing literature argues that social norms and solidarity prevailing in Africa constitute a significant handicap to micro-entrepreneurial investment (see Duflo et al., 2009; Nillesen et al., 2011), and a serious barrier to entrepreneurial choice (Alby et al., 2011; Grimm et al., 2012). However, the most widely documented constraints to informal entrepreneurship in Africa are lack of skills and initial capital requirements (Cunningham and Maloney, 2001; Fields, 1990). Following various theoretical models of inequality and poverty traps that emphasize the role of wealth distribution as an explanation of the coexistence of high and low returns in economic activities (see Aghion and Bolton, 1996; Banerjee and Newman, 1993; Ghatak and Jiang, 2002; Gine and Townsend, 2004; Lloyd-Ellis and Bernhardt, 2000; Piketty, 1997), skills and starting capital requirements have been empirically posited by some authors as being the main sources of the segmentation observed in the informal sector. A noticeable empirical contribution in the Sub-Saharan Africa context is Grimm et al. (2010) who studied how entry costs and starting capital affect marginal returns to capital in micro-enterprises. Using micro-enterprises data from West-African countries they show that different levels of starting capital can explain the observed heterogeneity in capital returns. Their findings, however, fit only entrepreneurial businesses and fail to identify the massive subsistence segment of informal activities characterized by very low capital stocks and low returns that coexists with these micro-enterprises in the informal sector.[2] Moreover, their framework does not allow to test and quantitatively evaluate the implications and magnitude of policy strategies, as a structural approach would do. This paper is therefore a complementary work to Grimm et al. (2010) in these respects.

The rest of the paper is organized as follows. Section 2 describes a theoretical model of occupational choice under imperfect credit markets and establishes the main implications for the informal sector. Data and reduced form results are presented in Section 3. Structural estimation of the theoretical model as well as nonparametric evaluation are performed in Section 4. Specification analysis and various robustness checks are provided in Section 5. Section 6 quantifies the impact of counterfactual policy experiments, followed by concluding remarks in Section 7. Section A.1 provides additional tables, figures and other technical details.

2. Model description and implications

In this section, I present a basic model that I estimate and use to evaluate and quantify the impact of economic policies toward the informal

[2] In fact, Grimm et al. (2010) find extremely high marginal returns of more than 100% at very low levels of capital, which is not consistent with data from subsistence activities in West Africa.