Entrepreneurship: structural transformation, skills and constraints

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Accepted: 7 July 2017 / Published online: 4 September 2017
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Abstract This paper revisits the place of the entrepreneur in the process of structural transformation and economic development, using representative data from Nigeria. The focus is on the allocation of self-employed individuals with different skill levels across sectors—primary, secondary and tertiary—and on its link to selectivity corrected returns to skills in these sectors. While self-employment is dominated by service sector activities and these activities attract more skilled individuals than do the manufacturing and primary sectors, the level of skills across all three entrepreneurial sectors is lower than that of both salaried workers and individuals who do not work. Returns to skills among self-employed individuals in the manufacturing sector are particularly low. This is at least partially explained by constraints to productive entrepreneurial activities and is inconsistent with the idea of smooth structural transformation towards innovative entrepreneurship. We discuss some conceptual and policy implications.

Keywords Entrepreneurship · Structural transformation · Economic development · Nigeria

JEL classification J22 · J24 · N80 · O14

1 Introduction

Following decades of research, the definition of “entrepreneurship” remains elusive (Nieman 2006). Historically, entrepreneurship has been associated with individuals’ ability to identify and capitalise on opportunities. Economies with higher numbers of entrepreneurs were believed to outpace economies with smaller numbers (Venter et al. 2010). According to Fillion (1997), entrepreneurial activities date back to as early as the seventeenth century which witnessed the emergence of new industrial firms. Early analysts like Jean Baptiste Say (1836) defined the entrepreneur of that era as a self-employed individual engaging in risky and profitable activities and creating value. The spirit of such earlier notions of entrepreneurship prevails in current definitions. OECD (1997) and Zimmerer and Scarborough (2008) define entrepreneurship as a form of self-employed activity that identifies opportunities and creates new ventures.

In line with this perception, earlier theoretical frameworks have seen entrepreneurship as a key driver of economic development, irrespective of whether the entrepreneur herself epistomises the process of growth-enhancing innovation (Schumpeter 1934) or is somebody who identifies profitable ideas that have already been introduced successfully to the market (Kizner 1976). While also seeing the entrepreneur as a promoter of economic development, others focus on her place in the process of structural transformation. For instance, drawing on the experience of currently developed economies, Porter et al. (2002) describe the different roles played by entrepreneurs across three stages of economic development, namely (i) a factor-

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driven stage, characterised by a dominant primary sector and unqualified labour force, (ii) an efficiency-driven stage, in which entrepreneurship drops because large firms hire most of the workforce, and (iii) an innovation-driven stage, in which the service sector becomes more important and the start up of new businesses, producing sophisticated products, increases. Ács and Naudé (2013) build upon this framework and see the link between economic development and innovative entrepreneurship as an S-shape type relationship. In the early, factor-driven stage of development the level of innovative entrepreneurial activities is low, accounting for no more than 5% of economic activities, but rises to 10% in the efficiency-driven stage and 30% in the innovation-driven stage. Moving onwards through the stages, the importance of knowledge accumulation and absorption increases.

The structural transformation-based conceptual framework of entrepreneurship is very helpful for understanding the synergy between skill development and entrepreneurial innovation as economies develop. It is also extremely helpful in understanding the historical development of entrepreneurship among currently advanced economies. It is interesting to try to answer the question to what extent it is useful as a basis for analysis and policy advice for a range of countries that are currently undergoing or about to undergo structural transformation. To begin with, this conceptual framework shies away from giving an explicit answer to the question of whether—following the example of currently advanced economies—countries starting at relatively low levels of income need to experience an efficiency-driven industrialisation stage before moving to a high skilled service-based economy. Fundamental classical theories of industrialisation-based economic development such as those of Rosenstein-Rodan (1943), Murphy et al. (1989) and Kaldor (1967) emphasise key advantages of manufacturing over services in the form of economies of scale, backwards, forward linkages and innovative potential. The role of the super-entrepreneur in achieving a “big (industrialisation based) push” à la Rosenstein-Rodan (1943) is fundamental.

At the same time, overwhelming evidence of urbanisation without industrialisation, as well as premature de-industrialisation in large parts of the less developed world, especially Africa and Latin America, casts doubts on the potential of contemporary less developed economies (and entrepreneurs within these economies) to capitalise on traditional modes of industrialisation options (Gollin et al. 2015; Rodrik 2016). While entrepreneurial success stories such as the ICT sector in India offer a service sector based

way forward in an era of manufacturing decline, a number of analysts question the employment (and innovation) augmenting potential of skill intensive services as an alternative to large scale manufacturing (Rodrik 2016; Szirmai 2009). Moreover, although stimulus for small business creation continues to be seen as a panacea to high levels of unemployment in contexts characterised by a significant decline of salaried employment (Dimova et al. 2016), there is evidence suggesting that the vast majority of small businesses in less developed countries share closer resemblance to hidden unemployment than dynamic entrepreneurship (Margolis 2014). Furthermore, macro level (cross-country) studies highlight higher positive correlation of national incomes with dominant salaried employment than with a dominant (secondary and tertiary sector based) small business sector (Margolis 2014). Indeed, in more contemporary research on motives behind self-employment, it is common to distinguish between *opportunity-driven*, dynamic type of entrepreneurship and *necessity-driven* self-employment that is more akin to hidden unemployment even within developed country contexts (Blanchflower 2004; Poschke 2013). Although investigating the motives behind entrepreneurship is not the primary concern of research on the role of the entrepreneur in the process of structural transformation, it is important to take into account at least the stylised variety of forms and nuances of entrepreneurial activities in order to grasp fully their economic development potential.

Irrespective of the modalities of self-employment, if potential entrepreneurs find it difficult to locate opportunities with high returns to skills and innovation, this would have obvious bearing on not only the utilisation of accumulated human capital but also on incentives for future human capital accumulation. Although much of the post-1960s international development agenda has prioritised investment in education as a key policy objective, there is evidence from several parts of the world that unemployment among highly educated youth is on the rise (Dimova et al. 2016; Kouakou 2011). There is also evidence to suggest that—on average—returns to skills are lower in the generally largest (non-agricultural) self-employment sector in less developed countries than in salaried employment, and there is high correlation between low availability of skill intensive job opportunities and low returns to skills, on the one hand, and low incentives to acquire skills, as well as high drop out rates from schooling, on the other (Dimova et al. 2010). The evidence suggests that a large proportion of the less developed part of the world may be undergoing a structural transformation, dominated by

transition from primary to tertiary sector—largely low skill activities—that is starkly different from a smooth transition from primary to efficiency led secondary and thereafter innovation-driven tertiary sector entrepreneurship. This highlights a potential scope for rethinking the contemporary applicability of traditional models of relatively smooth structural transformation and on the role of the entrepreneur in that transition.

In this paper, we revisit the issue of structural transformation in the process of economic development and the role of the entrepreneur and skill acquisition in this process with the use of evidence from Nigeria. Since the December 3, 2011 issue of the “*Economist*” described Africa as a “hopeful” continent, “Africa rising” has become a buzzword in both academic and policy circles. One of the highlights of this discussion is the fact that six out of the ten fastest growing countries in the world today are in Africa. Much of these countries’ success is attributed to entrepreneurial activities, technological advances and fledgling manufacturing and service sectors. Among African countries, the case of Nigeria was flagged as a success story when a rebasing exercise led to estimates of a GDP of US\$509 billion, making Nigeria the largest economy in Africa and the 26th largest in the world (World Bank 2014). Importantly, recent statistics revealed the economy as much more diversified than that highlighted in earlier estimates. Although oil and gas as well as sectors that service the local market (agriculture, trade, food and various services) continue to be important, these are estimated to account for only 54% of the Nigerian output (compared to earlier estimates of 84%). Sectors such as telecommunications, real estate, manufacturing, construction and entertainment are becoming increasingly important. In the context of these positive developments, the role of the entrepreneurial small and medium business sector is seen as catalytic in the achievement of Nigeria’s Vision 2020 to be among the 20 most industrialised economies by 2020 (Kadiri 2012). For the purposes of this study, it is particularly illuminating to note that the latest Global Competitiveness Report defines Nigeria as one of 17 countries in transition from factor-based to efficiency-based economy (World Economic Forum 2017).

At the backdrop of these positive developments, economic health continues to be dependent on the oil sector, as indicated by the budgetary and growth difficulties experienced in the aftermath of the sharp decline in oil revenues upon fall of oil prices between June 2014 and January 2015 (Barungi et al. 2015). Although the sheer size of the small and medium enterprise sector has increased

dramatically—by 14.3% from 32,414,844 to 37,067,416 in just 3 years between 2010 and 2013—estimates indicate that close to half of the working age population is unemployed (Small and Medium Enterprises Development Agency of Nigeria 2013). There is also concern that the quality of education provided may not be at par with the potential of the economy to innovate. Indeed, the same Global Competitiveness Report that identifies Nigeria as being in transition from factor to efficiency-based economy also gives its education and skill base a rank of 122 out of 135 countries. This raises the question of what proportion of the SME sector is truly entrepreneurial as opposed to a form of hidden unemployment.

The main purpose of this paper is to reconcile conflicting views in the broad conceptual literature on entrepreneurship and conflicting evidence on economic diversification and entrepreneurship in the process of structural transformation in Nigeria with the aim of drawing some generalisations and policy recommendations. Using a sophisticated econometric methodology, we first explore the allocation of labour belonging to different skill groups across different entrepreneurial sectors—primary, secondary and tertiary—salaried employment and not working and the related returns to skills across the different entrepreneurial sectors, after correcting for potential selection biases. This exercise helps us establish (i) whether entrepreneurs are a negatively selected sample of the overall working age population or, in other words, possess observed and unobserved characteristics inferior to those of salaried workers and non-working individuals and (ii) whether there are niches within the secondary and/or tertiary entrepreneurial sectors, which attract high skill workers and provide high returns to observed skills, thus creating incentives for acquisition of such skills among potential labour market entrants. We supplement this empirical exercise with detailed statistics that help us go beyond the averages inherent in an econometric analysis and delve further into the specific characteristics of entrepreneurs and their specific occupations. As a robustness check in the empirical analysis, we also present a version that distinguishes between stylised categories of entrepreneurs, namely those who employ and those who do not employ workers from outside the family as proxies of opportunity and necessity entrepreneurs, respectively.

The rest of the paper is organised as follows. Section 2 describes the econometric methodology used for the core empirical analysis. Section 3 describes the data and highlights some preliminary descriptive statistics. Results from the core econometric analysis are highlighted in Section 4,

and these are supplemented in Section 5 with results from more detailed descriptive analysis and further robustness checks based on differentiation between necessity and opportunity entrepreneurs. Section 6 concludes.

2 Empirical methodology

Our key objective is to assess the link between allocation of entrepreneurs with different skill levels across sectors—primary (agriculture), manufacturing and services—and the returns to these skills in each of these sectors. This relationship is captured by the following system of equations:

$$Y_s = X_s \beta_s + U_s \quad (1)$$

$$Y_s^* = Z_s \gamma_s + \eta_s, \quad s = 1 \dots M \quad (2)$$

where Y_s refers to earnings associated with each sector, while Y_s^* is a discrete choice variable, indicating the sector of allocation of entrepreneurs. Equation [2] is estimated using a multinomial logit model, while U_s satisfies $E(U_s|X) = 0$ and $V(U_s|X, Z) = \sigma^2$.

Note that if we rely on an OLS model, each of the latent (wage) Equations in [1] would be estimated separately. As such, for each of the sectors of interest to us, we can use stylised Mincer type specification, where the key regressors in the wage-skill relationship are measures of observed skills, such as education. We can thus produce estimates of returns to skills in the primary, secondary and tertiary entrepreneurial sectors, ignoring the fact that individuals may not be randomly selected into each of these sectors. However, given that choosing an employment sector is unlikely to be a result of a random process—such that U_s and η_s are not independent—the least squares estimates of β_s would be biased.

To correct for this potential bias, we use the Bourguignon, Fournier and Gurgand's (BFG) methodology (2001). This leads to the modification of Eq. [1] into:

$$Y_i = X_i \beta_i + \sigma_i \left[\rho_i m(P_i) + \sum_{j \neq i} \rho_i \frac{P_j}{(P_j - 1)} m(P_j) \right] + v_i \quad (3)$$

where β_i are the bias-corrected estimates of returns to individual attributes in each of the entrepreneurial

sectors of interest, while X_i is the vector of these attributes. The key difference between Eqs. [1] and [3] is the added $\sigma_i \left[\rho_i m(P_i) + \sum_{j \neq i} \rho_i \frac{P_j}{(P_j - 1)} m(P_j) \right]$ term, which identifies the direction of the selectivity bias. Notationally, $m(P_s)$ represent the probabilities of ending in any one of the possible sectoral choices, while $(\sigma_1 \rho_1, \dots, \sigma_s \rho_s)$ are the corresponding estimates of selectivity bias associated with each respective sector.

Intuitively, these selectivity correction coefficients tell us whether entrepreneurs that end in say the manufacturing sector are either positively or negatively selected in that sector compared to entrepreneurs allocated to either the agricultural or the service sectors. If, for instance, we see that the selection coefficient associated with service sector employment in the earnings equation of entrepreneurs allocated in the manufacturing sector is negative and significant, we would argue that entrepreneurs in the manufacturing sector are negatively selected compared to those employed in the service sector. Their unobserved skills are more appropriate for employment in the service sector, but they are misallocated to the manufacturing sector. In other words, aside from providing unbiased estimates of returns to observed skills, such as education, the BFG method allows us to indirectly assess the influence of unobserved skills (such as being inherently entrepreneurial), which are difficult to measure, but tend to play an important role in the allocation of entrepreneurs across employment opportunities.

As discussed at the outset of this section, our main interest is in assessing the allocation of entrepreneurs across entrepreneurial sectors and their returns to skills in those sectors. However, if we only focus on the sample of entrepreneurs, we would be working with a selected sample due to the fact that entrepreneurs are not randomly selected from the working age population at large. To correct for this additional source of selectivity, we work with the full sample of working age individuals but include two additional choices in the first stage of our empirical model, those accounting for allocation of individuals into salaried employment and into not working. In addition to helping us alleviate the potential selectivity problem, these labour market choices allow us to find out whether entrepreneurs are positively or negatively selected (or, in other words, have either superior or inferior observed and/or unobserved characteristics) compared

to those allocated in the salaried sector and those who are not employed. This aligns neatly with development economics literature which tries to answer the question of whether self-employment is a form of dynamic entrepreneurship (Maloney 1999, 2004) or whether instead it is more akin to hidden unemployment (Mazumdar 1983; Fields 1990).

In sum, we estimate the following system of equations:

$$\begin{aligned} \ln Wages = & \alpha_0 + \sum (\alpha_{1i} Education) + \alpha_2 Age \\ & + \alpha_3 Female + \alpha_4 Year + \alpha_5 Urban + u \end{aligned} \quad (4)$$

$$\begin{aligned} Sector = & \beta_0 + \sum (\beta_{1i} Education) + \beta_2 Age + \beta_3 Female \\ & + \beta_4 Year + \beta_5 Urban + \beta_6 FathernotAgriculture + \beta_7 MothernotAgriculture \\ & + \beta_8 AccesstoBank + \beta_9 ClosenesstoMarket + \beta_{10} AccesstoTransportation + v \end{aligned} \quad (5)$$

where as discussed earlier, the Sector variable in [5] includes the following categories: (i) Entrepreneur in Agriculture, (ii) Entrepreneur in Manufacturing, (iii) Entrepreneur in Services, (iv) Salaried Employee and (v) Individual that does not work. It is estimated with the use of a multinomial logit model. Equation [4], in turn, gives unbiased estimates of returns to entrepreneurial skills in the three sectors of entrepreneurial allocation considered, where in each case we are able to assess whether entrepreneurs in the sector of interest are positively or negatively selected compared to individuals in the remaining four labour market categories. While the earnings equations's specification is a version of a stylised Mincer equation, following related literature (Dimova et al. 2010; Dimova and Karim 2016) in the selection equation, we include variables that directly affect the choice of a sector but do not directly (other than through the choice of a sector of employment) affect the earnings of entrepreneurs. These include the sector of employment of mothers and fathers of the respondent (as a proxy of intergenerational transfer of occupational status) and infrastructural variables, capturing whether the community of residence of the respondent has access to a bank and public transportation, as well as whether that community is close to a market. Given that the majority of respondents' parents were employed in the agricultural sector, we use dummy variables of whether either the father or the mother of the respondent had employment outside of agriculture. Aside from serving as excluded variables for the identification of our system, the infrastructural variables are

key proxies of entrepreneurial constraints. In keeping with the literature on the links between access to finance and industrialisation and in particular the part of this literature, exploring the constraints faced by entrepreneurs in both entering profitable manufacturing sector niches and being able to grow after they create a business (Kerr and Nanda 2009), we are particularly interested in the effect of the access to finance variable in our selection equation. Since a household level version of this variable in the employment selection equation would be endogenous, we rely on a community level version. The choice of these infrastructural variables is consistent with those identified by the World Economic Forum (2017) as constraints to entrepreneurial activities that can plausibly be measured at the community level.

3 Data and preliminary statistics

The empirical analysis in this paper is based on the Living Standards Measurement Survey (LSMS) of the World Bank. This is a general household survey, established in the early 1980s in collaboration with statistical offices around the world, generating high quality representative household data. The Nigerian surveys were conducted in collaboration with the National Bureau of Statistics and the Bill and Melinda Gates Foundation in 2010/2011 and 2012/2013. The two waves can be used either as a panel or as individual cross-sections. Given the nature of our econometric model, we do not exploit the panel element but simply pool the two annual cross-sections together and

include a yearly dummy variable to account for a time fixed effect.

The dataset is fairly rich. Aside from very detailed consumption/expenditures and incomes modules, it provides very detailed demographic information, as well as labour market/occupational information and community characteristics. To ensure consistency with the labour economics literature, we limit our samples to exclude individuals who fall outside the working age population. The sample for this study thus only includes individuals in the 15–65 age group. Due to data limitations in the recording of hours of work, we use monthly (take home) incomes as a proxy for earnings from entrepreneurial and non-entrepreneurial activities. In keeping with the definition of entrepreneurs, highlighted at the outset, we define entrepreneurs as individuals involved in self-employed activities. We then further categorise the occupational sectors of entrepreneurs in three different groups: agriculture, manufacturing and services.¹ Given the limited number of observations in high education categories, we club different degrees together and capture educational attainment by two different categories: “complete primary education and incomplete secondary education” and “complete higher secondary and above”. This allows us to avoid inconsistencies in the recall of actual years of education and is consistent with alternative specification that we attempted. The omitted category includes entrepreneurs with no education or with informal education. All infrastructural variables are taken from the community module and are dummy variables indicating whether there is either a bank or a market in the enumeration area and whether the enumeration area has access to public transport.

Figure 1 highlights the sectoral allocation of entrepreneurs. We see that the self-employment sector is dominated by services. The service sector accounts for 52% of the self-employed activities. At the same time, the manufacturing sector accounts for only 8% of the self-employed activities. This pattern is not necessarily inconsistent with the Porter et al. (2002) conceptual framework whereby the efficiency-driven (typically manufacturing based) stage of the structural transformation process is characterised by entrepreneurial decline

due to dominance of large firms hiring most of the workforce. At the same time, additional statistics from Nigeria (and the majority of the rest of the African continent) indicate that the low level of self-employment in manufacturing is a reflection of the low level of manufacturing activities overall (across both self and salaried employment), alongside dominance of service sector-based non-agricultural employment (The World Bank 2013). The pattern is more consistent with trends of premature de-industrialisation than low level of small and medium sector manufacturing activities due to a manufacturing sector dominance by large firms.

Table 1 reports some key characteristics of entrepreneurs in the agricultural, manufacturing and service sectors and compares them with the characteristics of salaried employees and labour force members who do not work. One of the most interesting observations is the fact that self-employed individuals are significantly less educated than both salaried employees and those who do not work. While more than a quarter of the salaried individuals and the individuals who do not work have completed secondary or tertiary education, a significantly smaller percentage of those who are self-employed have these higher educational degrees. Self-employed people in the agricultural and in the manufacturing sectors have the lowest levels of education (only approximately 9% of those in the manufacturing sector have completed secondary education or above and this is true for only 10% of those in the agricultural sector). The incidence of secondary or higher education among self-employed individuals in the service sector is slightly higher—approximately 18%—but even then less than that of salaried employees and those who do not work. The cross-sectoral educational differences are less stark when looking at individuals who have completed primary or some secondary education, but even then, education is lowest among self-employed individuals in the manufacturing sector.

The educational distributions across sectors are consistent with the pattern of cross-sectoral average incomes: on average, incomes in the salaried sector exceed those of self-employed individuals; while among self-employed individuals those employed in the service sector earn more than those in the other two sectors. Taken together, these patterns are consistent with evidence elsewhere in Africa whereby low returns to skills, especially in the dominant sector of self-employment, discourages individuals from pursuing higher levels of education (Dimova et al. 2010). In addition to interesting patterns

¹ Note that only a minuscule number (two to three) entrepreneurs defined themselves as belonging to the oil sector—perhaps not surprisingly due to the largely capital intensive nature of that sector and hence the low ability to capture such entrepreneurs in a representative household survey. We therefore dropped them from our analysis. But allocating them to the agricultural primary sector did not significantly change our results.

Fig. 1 Sectoral distribution of entrepreneurs

related to the key variables of interest to us, namely education and earnings, we observe interesting differences in the means of the infrastructural variables across sectors. Perhaps most interestingly, the mean of the access to a bank variable is significantly lower in the service self-employment sector than in the rest of the sectoral

categories. It is possible that better educated individuals allocate to the service sector not because of better (average) opportunities but because of constraints that prevent them from allocating into more capital intensive sectors. In the next section, we shall explore this possibility in greater rigour.

Table 1 Descriptive statistics

	Entrepreneur agriculture	Entrepreneur manufacturing	Entrepreneur services	Salaried	Not working
Age	39.3646 (13.9726)	36.3069 (11.4131)	39.0021 (12.1847)	36.3696 (12.7733)	27.8410 (12.1066)
Primary or incomplete secondary	0.2676 (0.4427)	0.2019 (0.4016)	0.2839 (0.4509)	0.2943 (0.3957)	0.2486 (0.4322)
Complete higher secondary or above	0.1054 (0.3071)	0.0898 (0.2861)	0.17884 (0.3832)	0.2678 (0.4429)	0.2530 (0.4347)
Female	0.4116 (0.4921)	0.8229 (0.3818)	0.6267 (0.4836)	0.4398 (0.4964)	0.5921 (0.4914)
Father (non-agriculture)	0.0740 (0.2619)	0.1770 (0.3818)	0.2991 (0.4579)	0.2738 (0.4459)	0.1927 (0.3944)
Mother (non-agriculture)	0.2376 (0.4256)	0.6494 (0.4773)	0.5530 (0.4972)	0.3667 (0.4819)	0.2995 (0.4580)
Access to bank	0.2441 (0.4295)	0.2363 (0.4252)	0.1978 (0.3984)	0.2183 (0.4131)	0.2316 (0.4218)
Closeness to market	0.5783 (0.4938)	0.5765 (0.4943)	0.5800 (0.4935)	0.5526 (0.4972)	0.5824 (0.4931)
Access to transportation	0.4421 (0.4966)	0.4395 (0.4965)	0.4778 (0.4995)	0.4413 (0.4966)	0.4643 (0.4987)
Urban	0.0723 (0.2591)	0.2766 (0.4475)	0.4531 (0.4978)	0.3971 (0.4893)	0.3549 (0.4785)
2012/2013	0.4612 (0.4985)	0.5258 (0.4995)	0.5470 (0.4978)	0.5831 (0.4930)	0.4877 (0.4998)
Log monthly income	9.1468 (1.1256)	9.0432 (1.2001)	9.6345 (1.1872)	10.1739 (1.1460)	
Observation	7730	1154	5971	4461	14,032

The figures in brackets are standard deviations

Table 2 Multinomial logit 2010–2013

	Entrepreneur agriculture	Entrepreneur manufacturing	Entrepreneur services	Salaried	Not working
Age	0.0066 ^a (0.0001)	0.0002 (0.0000)	0.0059 ^a (0.0001)	0.0033 ^a (0.0001)	−0.0162 ^a (0.0002)
Primary or incomplete secondary	0.0100 ^b (0.0051)	−0.0047 ^a (0.0019)	0.0751 ^a (0.0064)	0.0179 ^a (0.0054)	0.0402 ^c (0.0077)
Complete higher secondary or above	−0.1000 ^b (0.0051)	−0.0161 ^a (0.0020)	0.0125 ^b (0.0070)	0.0650 ^a (0.0068)	0.0386 ^b (0.0086)
Female	−0.1335 ^a (0.0046)	0.0326 ^a (0.0019)	0.0620 ^a (0.0045)	−0.0638 ^a (0.0043)	0.1027 ^a (0.0061)
Father (non-agriculture)	−0.0988 ^a (0.0053)	0.0094 ^a (0.0018)	0.0498 ^a (0.0062)	0.0628 (0.0062)	−0.0043 (0.0081)
Mother (non-agriculture)	−0.0806 ^a (0.0044)	0.0413 ^a (0.0026)	0.1222 ^a (0.0053)	0.0201 ^a (0.0045)	−0.0627 ^a (0.0067)
Access to bank	0.0217 (0.0058)	0.0055 ^c (0.0024)	−0.0340 (0.0056)	−0.0010 ^a (0.0056)	0.0078 (0.0079)
Closeness to market	0.0003 ^b (0.0051)	−0.0005 (0.0019)	0.0021 ^a (0.0053)	0.0101 ^b (0.0050)	−0.0088 ^b (0.0072)
Access to transportation	0.0215 ^b (0.0053)	−0.0063 (0.0020)	−0.0229 ^a (0.0055)	−0.0036 ^a (0.0052)	0.0086 ^a (0.0074)
Urban	−0.2326 ^b (0.0041)	0.0018 ^a (0.0017)	0.0869 ^a (0.0053)	0.0373 ^a (0.0047)	0.1102 ^a (0.0068)
2012/2013	−0.0588 ^a (0.0045)	−0.00245 ^a (0.0017)	0.0376 (0.0048)	0.0615 (0.0046)	−0.0379 ^a (0.0065)
Observation	7730	1154	5971	4461	14,032

The results reported are marginal effects. The figures in brackets are standard errors. The results meet the independent and irrelevant alternative conditions. IIA test results are reported in Appendix Table 9

^a Significance at 1%

^b Significance at 5%

^c Significance at 10%

4 Empirical results

Tables 2 and 3 highlight the results from our rigorous empirical analysis. Table 2 reports the marginal effects

from the multinomial logit model on labour allocation across salaried employment, not working and the three entrepreneurship sectors of interest to us—agriculture, manufacturing and services—while Table 3 presents the

Table 3 Earnings estimations

	Entrepreneur agriculture	Entrepreneur manufacturing	Entrepreneur services
Age	0.0213 (0.0157)	−0.0165*** (0.0416)	−0.0130 (0.0140)
Primary or incomplete secondary	0.2388*** (0.2163)	0.0725 (0.9896)	0.16889*** (0.1309)
Complete higher secondary or above	0.6339 (0.7538)	0.8890 (1.5957)	0.1378** (0.2679)
Female	−0.0981*** (0.5059)	−0.7140 (1.4201)	0.5038 (0.1830)
Urban	1.3116*** (0.9404)	0.2383 (0.4480)	−0.3550 (0.1808)
2012/2013	0.1171** (0.0553)	−0.3020 (0.0981)	−0.1954 (0.0378)
M1	−1.1413 (1.0047)	−0.5569 (3.6821)	−2.6920*** (0.7236)
M2	0.3758 (2.9587)	0.6572** (2.8437)	0.7365 (1.9795)
M3	2.2641 (1.6327)	−2.4815 (4.7811)	−0.6686 (0.4332)
M4	−1.3340 (2.2263)	1.1312 (0.6411)	−4.0692*** (1.1793)
M5	−1.8196** (1.7378)	1.7305 (0.1535)	−0.6039 1.1448
Cons	8.4812*** (1.1358)	9.1644 (1.7436)	8.9752 (1.5105)
R-squared	0.0856	0.3471	0.2089
Observation	7730	1154	5971

The figures in brackets are standard errors

***, ** and * indicate significance at the 1%, 5% and 10% level, respectively

estimates of returns to different types of education, after accounting for potential biases due to non-random allocation of people across the different labour market sectors. Recall that our main interest is in finding out whether entrepreneurs are able to locate skill intensive niches in the entrepreneurial market, especially in the secondary and tertiary sectors, and obtain high returns to their observed skills. Indirectly, answering this question—especially in comparison to the allocation of labour to salaried employment and not working—will also indicate whether the entrepreneurial sector is dynamic, with potential to generate innovation, or whether it is instead a form of hidden unemployment.

The marginal effects of the complete secondary or higher education variable are negative and significant in the agricultural and manufacturing sectors and positive and significant in salaried employment and the service entrepreneurial sector. In addition, the marginal effects of the complete primary or some secondary education variable are positive and significant in all but the manufacturing sector equation. The marginal effect of both educational variables is negative and significant in the manufacturing entrepreneurial sector, highlighting the clear negative selectivity—based on observed skills—into that sector. Furthermore, while the marginal effect of completed secondary education and above is positive and significant in the service sector, the size of this effect is substantially smaller than that if the marginal effect of this variable in the salaried employment sector and even in the sector of not working. Overall, high levels of education do not matter—in fact have negative implications—for being self-employed as opposed to salaried employed, except in the service sector which tends to host relatively educated self-employed people.

Infrastructural variables have significant impact on labour allocation across sectors, with the expected sign. The marginal effect of access to finance is positive and significant in the potentially most capital intensive manufacturing entrepreneurial sector but is negative and significant in the salaried employment sector. This is consistent with evidence that access to finance is one of the largest constraints to productive entrepreneurship in less developed countries. At the same time, closeness to markets has positive impact on being self-employed in either the agricultural sector or the service sector as well as on being salaried employee and has negative effect on not working,

while access to transportation matters most for entrepreneurs in the agricultural sector. As expected, family background also plays important role for labour allocation, with all coefficients having the expected signs. The overall message is that having parents with non-agricultural employment has positive implications on children's non-agricultural employment, either as self-employed individuals or as salaried employees. In sum, the story from this stage of the analysis is that tinkering with policy variables, such as those related to infrastructural—and in particular financial sector—development, may have positive implications for the creation of productive entrepreneurial sector niches. At the same time, in keeping with the descriptive statistics presented in the previous section, there is paucity of high skill opportunities in the entrepreneurial sector.

The results from the second stage of the empirical analysis (Table 3) are consistent with the story emanating from the first stage. Both educational variables are positive and significant only in the service sector. In the agricultural sector, completed primary and incomplete secondary education provides positive returns, while none of the educational variables are significant in the manufacturing sector. Age has significant (and negative) effect only on self-employment in manufacturing.² Unobserved characteristics appear to have stronger effect on returns to skills in the three different self-employment sectors than do observed skills, as indicated by the significance of the selectivity correction variables. Perhaps most interestingly, the selectivity correction term associated with agricultural self-employment in the service self-employment equation is negative and significant, highlighting a negative selection out of agriculture into services. In other words, self-employed individuals who would have performed better in the agricultural sector allocate into the service sector. The same is true for the coefficient associated with salaried employment in the service sector equation, suggesting that capable individuals may be queuing up for salaried jobs, but instead opt for self-employed activities in the service sector. This is consistent with dual market models of structural transformation and casts some doubts on the success of structural transformation.

² Experimenting with non-linearity in the age-employment relationship indicated that the effect is linear.

5 Further empirical analysis and discussion

5.1 Further insights from alternative descriptive statistics

The analysis conducted so far is based on average estimates across the five different employment sectors of interest to us. Among the key findings is the fact that salaried employment is the one sector that both attracts individuals with high levels of education and provides significant positive returns to that education. Among self-employment sectors, only the service sector appears to be a profitable venue for skilled individuals, suggesting that the country may be skipping the industrialisation stage of the stylised structural reform process and moving straight away to the stage of de-industrialisation. At the same time, skilled labour allocation in that sector is inferior to that of salaried employment—as witnessed by both the descriptive statistics and the more rigorous empirical analysis. This is consistent with the fact that the wage distribution in the salaried self-employment sector lies substantially to the left of that for salaried employees, although it is clearly to the right of self-employed individuals in the manufacturing and agricultural sectors (Fig. 2). In other words, the de-industrialisation process in Nigeria does not obviously share the characteristics of successful de-industrialisation in the process of structural reform, described by Porter et al. (2002).

To overcome the constraints of working with sectoral averages and get more detailed insight into the nature of work across the different self-employment sectors and

salaried employment, Table 4 delves deeper into the concrete occupational niches within which individuals across salaried employment and the three self-employment sectors operate. We see that within manufacturing, the dominant sub-sectors are food, beverages and tobacco, textiles, apparel and footwear and wood and wood products, all of which tend to be at the bottom of the value chain and hence associated with low skill activities. This is consistent with the results from our empirical analysis in that the manufacturing self-employment sector attracts both some of the lowest skill individuals and provides low returns to skills. Moreover, the incidence of salaried employment in the manufacturing sector is low, which is contrary to traditional models of industrialisation, characterised by large-scale manufacturing production.

While professional and scientific occupations are available in the self-employment service sector, roughly at par with the incidence of these same types of occupations in the salaried sector, they represent a minuscule fraction of the overall range of job opportunities. Indeed, the self-employment service sector is by far dominated by buying and selling activities, followed by personal services, neither of which is known for high levels of skill intensity and innovation capacity. The service sector does absorb some professionals and education and health specialists, but their representation in that sector is minuscule compared to the dominant two sets of activities. By contrast, the dominant salaried sector is that of public administration, followed by the education sector. While high skills and corresponding adequate earnings in a countries' public

Fig. 2 Monthly income distribution across sectors. Kernel densities for monthly income 2010/2013

Table 4 Types of activity

	Agriculture	Manufacturing	Services	Salaried
Agriculture	7730	0	0	1591
Manufacturing (food, beverage and tobacco)	0	583	0	62
Manufacturing (textiles, apparel and footwear)	0	424	0	25
Manufacturing (wood and wood products)	0	120	0	24
Manufacturing (chemical and pharmaceutical products)	0	15	0	1
Manufacturing (plastic and rubber products)	0	10	0	3
Manufacturing (electronic)	0	2	0	10
Professional/scientific	0	0	190	250
Electricity/water/gas/	0	0	14	45
Transportation	0	0	310	190
Buying and selling	0	0	3460	261
Financial/insurance/real estate	0	0	20	55
Personal services	0	0	1340	229
Education	0	0	181	643
Health	0	0	144	215
Public administration	0	0	176	710
Other service activities	0	0	136	147
Observation	7730	1154	5971	4461

The figures reported are numbers of observations per cell

administration sector are important for strengthening of countries' institutions and governance, absorbing a disproportionate part of the skilled workforce in that sector may have a crowding out effect on innovative private sector activities. In comparison, salaried sectors like health—that are inherently skill intensive—are relatively smaller.

Table 5 highlights some further information, some of which needs to be interpreted with caution, due to the fact that on occasion—for instance with respect to whether entrepreneurs hire people from outside the family or not—there are a lot of missing observations. The information provided is generally inconsistent with the perception of self-employment as a sector of dynamic entrepreneurship. While one of the most popular definitions of a dynamic entrepreneur is one of an entrepreneur who is able to expand her business and create employment (Chen 2014; Margolis 2014), we see that the majority of entrepreneurs in our sample do not hire anyone from outside the family, while only a handful hire between one and five labourers. The propensity of entrepreneurs to export is also very low and the majority of self-employed individuals sell directly to final customers as opposed to exploring forward and downward linkages. Finally, a dominant proportion of self-employed individuals either work from home or at a

roadside, which is characteristic of some of the worst forms of employment (Chen 2014).

5.2 Further conceptual insights and empirical robustness checks

To provide further insights into the nature of entrepreneurship in Nigeria, especially given the conceptually mixed results so far on entrepreneurship in the service sector, we delve even deeper into the notion of necessity versus opportunity entrepreneurship highlighted at the outset of the paper. Specifically, we use one of the most popular stylised ways of differentiating between necessity and opportunity entrepreneurs in the literature (Poschke 2013) whereby the former are defined as self-employed individuals who expand their businesses by hiring labour from outside the family, while the latter are own account self-employed individuals who do not hire any non-family labourers. We thereafter call the first group of self-employed people “employers” and the second group “own account self-employed”. The focus is on whether these two different groups of entrepreneurs are fundamentally different. As indicated in the preceding section, due to a relatively large incidence of absence of

Table 5 Further characteristics

	Agriculture	Manufacturing	Services
Where do they sell their products			
Home (inside resident)	1363	523	1322
Home (outside resident)	558	155	1119
Industrial site	18	15	71
Traditional market	550	79	930
Commercial area shop	133	66	622
Roadside	139	33	314
Other fixed place	80	24	222
Mobile/no fixed location	350	36	580
Other	40	4	37
Who do they sell their products to			
Final consumers	2664	804	4743
Traders	602	118	613
Other small businesses	222	55	277
Large established bus	32	7	64
Institution (i.e. schools)	29	4	67
Export	14	0	2
Manufacturers	11	4	22
Other (specify)	84	6	128
	3658	998	5916
Number of hired workers who are not family members			
None	2113	817	3862
1–5 people	560	154	859
6–10 people	9	4	31
10 and above	15	2	14

The figures reported are numbers of observations per cell

response to the question of whether these self-employed individuals hire labourers, the results should be treated with caution and are therefore only reported in the Appendix.

Looking first at the descriptive statistics based on this differentiation (Table 6 in the Appendix), we see that—as expected—among non-agricultural self-employed individuals, employers tend to be characterised by greater incidence of completed secondary or higher education than own account self-employed individuals. Employers in the service sector are also characterised by higher incidence of completed primary or some secondary education than their own account counterparts, but the opposite is true for the incidence of completed primary education of their manufacturing sector counterparts. There are no other very

remarkable differences across the two different types of self-employed individuals, except that (consistently with their higher levels of education) employers tend to earn slightly more than own account individuals, though once again significantly less than salaried employees.

Tables 7 and 8 in the Appendix highlight the corresponding multinomial logit and earnings equations. Once again, the conceptual distinction with respect to Tables 2 and 3 is the differentiation between employers and own account individuals among the self-employed in each of the three entrepreneurial sectors. The marginal effects from the multinomial logit model reveal some interesting distinctions among the two categories of self-employed individuals. Perhaps most interestingly, while the complete secondary education or above variable has positive and insignificant effect on being an employer in the service sector, the effect of this variable on becoming own account self-employed individual in the service sector is negative and significant. This is consistent with our expectations based on the literature indicating that employers are better endowed opportunity entrepreneurs, while own account self-employed individuals are more likely to be necessity entrepreneurs. At the same time, the marginal effects of this higher education variable are negative and significant in all the remaining entrepreneurial niches, although their sizes are larger among employers in the agricultural and manufacturing sector than among their own account counterparts. By contrast, the marginal effects of the secondary or higher education variable are positive and significant in both the salaried workers' and non-working individuals' equations. For all types of self-employed individuals, the marginal effect of the primary or some secondary education variable is positive and significant in the agricultural sector and the service sector but negative and significant among employers in the manufacturing sector. This is yet another indication of the negative selection of entrepreneurs in the manufacturing sector. In sum, the association between education and labour market allocation gives further support to the general finding that self-employed individuals as a whole are a negatively selected sample of the overall working age population.

The rest of the results from the multinomial logit model are consistent with their Table 2 counterparts. Among the most interesting highlights is perhaps the fact that the access to a bank variable has a positive impact on becoming an employer in the manufacturing sector but has no significant effect on becoming an own account individual, once again emphasising the importance of access to

finance for becoming productive entrepreneur in this capital intensive sector.

Finally, the earnings estimates highlighted in Appendix Table 8 are consistent with those in Table 3, whereby only in the service sector self-employed individuals obtain significant positive returns to higher levels of education, while in the agricultural sector self-employed individuals obtain significant positive returns to completed primary or incomplete secondary education. In both cases, the returns are significantly higher among employers than among own account individuals. With respect to selectivity, based on unobserved characteristics, perhaps the most clear, visible and easiest to interpret pattern is that of the negative selection of self-employed individuals in the manufacturing sector out of the self-employed service sector. This is consistent with the rest of the story emanating from our empirical research.

6 Concluding comments and extensions

Using representative data from Nigeria, this paper revisits the place of the entrepreneur in the process of structural transformation and economic development from the point of view of an economy that has undergone significant movement out of the primary employment sector but is at a relatively low position in the global industrial value chain, has a small manufacturing sector and is dominated by a service sector that is the largest absorber of relatively skilled self-employed individuals. In doing so, we cast fresh light on theories of entrepreneurship that see the link between entrepreneurship and broader forms of economic development in concrete structural transformation stages, whereby exit from the primary sector and growth of self-employment in the secondary and service sectors is seen as proxy for successful economic development. While the self-employment sector is dominated by service sector activities and these activities attract more skilled individuals than do the self-employed manufacturing and primary sectors, the level of skills across all the three entrepreneurial sectors is lower than that of both salaried workers and individuals who do not work. Allocation of skilled labour and returns to skills among entrepreneurs in the manufacturing sector are particularly low.

Aside from skill allocation patterns, there are several additional signs that the self-employment as a whole is more akin to necessity than opportunity entrepreneurship. The majority of businesses either do not hire outside labour or hire no more than five workers, exemplifying limited

growth potential of the entrepreneurial sector and hence limited potential of exploiting economies of scale. There are high infrastructural—in particular credit related—constraints to allocation of labour into potentially productive occupations. Moreover, while models of economic development through industrialisation emphasise the advantage of backwards and forwards linkages, our evidence suggests that such linkages are limited in the Nigerian context. This is contrary to a stylised view of successful structural reform led by either efficiency or innovation, highlighted at the outset, and is consistent with evidence from elsewhere in the Global South, in particular the rest of the African continent (Margolis 2014; Chen 2014; Böhme and Thiele 2014; Dimova et al. 2010).

As the evidence on infrastructural and credit constraints to business growth is pervasive in the literature on entrepreneurship in less developed countries, this literature agrees on at least two related productive ways forward. On the one hand, there is a consensus that releasing financial constraints would stimulate investment in capital-intensive sectors and activities (The World Bank 2008). At the same time, evidence on positive implications of ensuring access to finance on (small) firm performance and growth is inconclusive (Grimm 2016; Karlan and Morduch 2010). Indeed, there is evidence that, in risky environments, individuals that are wealthy and hence not credit constrained tend to over-invest at the start of their business but adjust their capital stocks downwards subsequently (Grimm et al. 2011). This suggests that lifting financial constraints alone may not be a panacea when the institutional setting does not provide adequate risk management mechanisms. On the other hand, authors argue that the problem of infrastructural constraints is best addressed in the context of industrial clusters. In the current state of globalisation and de-coupling of production, where exploiting manufacturing economies of scale within a single national geographical context may be limited, the potential of industrial clusters for entry and movement up a value chain should certainly not be underestimated. This idea however clashes with counterarguments that the evidence of success with broad-based development and movement up the technological ladder on account of industrial clusters and value chains is either limited or unequal (Yusuf 2003; Brookings 2015).

One proposition that not only receives increasing consensus in the conceptual literature on economic development but also has large amount of support from historical evidence is that fundamental institutional change is a necessary ingredient to broad-based economic development (Shirley 2008; North et al. 2009; Rodrik 2008). This gives

Appendix

Table 6 Descriptive statistics based on distinction between employers and own account individuals

	Agriculture		Manufacturing		Services		Salaried	Not working
	Employers	Own account self-employed	Employers	Own account self-employed	Employers	Own account self-employed		
Age	38.5169 (14.1356)	38.7017 (13.0374)	35.97112 (11.1476)	37.9285 (12.1926)	38.8458 (12.1997)	36.6867 (12.1167)	36.4988 (12.8200)	27.03806 (11.6001)
Primary or incomplete secondary	0.2228 (0.4173)	0.2974 (0.4572)	0.2349 (0.4243)	0.3469 (0.4809)	0.3050 (0.4605)	0.2188 (0.4142)	0.2464 (0.4311)	0.3046 (0.4603)
Complete higher secondary or above	0.1335 (0.3402)	0.1485 (0.3566)	0.1060 (0.3081)	0.0816 (0.2766)	0.2434 (0.4292)	0.2830 (0.4513)	0.3800 (0.4855)	0.3029 (0.4595)
Female	0.4100 (0.4918)	0.2456 (0.4317)	0.7857 (0.4178)	0.8117 (0.3911)	0.6424 (0.4793)	0.6169 (0.4873)	0.4195 (0.4935)	0.5962 (0.4906)
Father (non-agriculture)	0.0764 (0.2657)	0.0701 (0.2561)	0.1912 (0.3934)	0.1785 (0.3900)	0.3074 (0.4614)	0.2935 (0.4565)	0.2926 (0.4550)	0.1990 (0.3993)
Mother (non-agriculture)	0.2378 (0.4258)	0.3859 (0.4882)	0.6673 (0.4714)	0.8214 (0.3900)	0.5601 (0.4964)	0.5870 (0.4935)	0.3825 (0.4860)	0.2939 (0.4556)
Access to bank	0.24466 (0.4299)	0.2348 (0.4477)	0.2380 (0.4217)	0.2369 (0.4217)	0.1920 (0.3858)	0.1907 (0.4390)	0.2281 (0.4197)	0.2339 (0.4233)
Closeness to market	0.5731 (0.4930)	0.5747 (0.4942)	0.58462 (0.4912)	0.5842 (0.4600)	0.57033 (0.4954)	0.5706 (0.4743)	0.5709 (0.4963)	0.5825 (0.4931)
Access to transportation	0.4446 (0.4969)	0.4312 (0.5013)	0.4385 (0.4755)	0.42629 (0.4947)	0.4776 (0.4989)	0.4774 (0.5009)	0.4615 (0.4985)	0.4653 (0.4988)
Urban	0.0754 (0.2641)	0.1111 (0.3151)	0.2898 (0.4539)	0.2828 (0.4973)	0.4617 (0.4985)	0.42288 (0.4952)	0.4257 (0.4945)	0.3517 (0.4833)
2012/2013	0.5050 (0.5000)	0.6081 (0.4895)	0.4970 (0.5002)	0.5714 (0.5039)	0.5312 (0.4990)	0.6417 (0.4806)	0.5273 (0.4993)	0.4106 (0.4919)
Log monthly income	9.22576 (1.1840)	9.1626 (1.0768)	8.8068 (1.2590)	8.6029 (0.8955)	9.5896 (1.2101)	9.4880 (1.3600)	10.0161 (1.1470)	
Observation	584	2113	158	817	904	3862	4461	14,032

Table 7 Multinomial logit results, based on the distinction between employers and own account self-employed individuals (IIA test: Appendix Table 10)

	Agriculture		Manufacturing		Services		Salaried	Not working
	Employers	Own account self-employed	Employers	Own account self-employed	Employers	Own account self-employed		
Age	0.0050*** (0.0002)	0.0004*** (0.0000)	0.0005 .0001	0.0000 (0.0000)	0.0097*** .0003	0.0007*** (0.0001)	0.0025** (0.0002)	-0.0191 *** (0.0004)
Primary or incomplete secondary	0.0189*** (0.0068)	0.00611 *** (0.0016)	-0.0096** (0.0044)	0.0013 (0.0012)	0.0541*** (0.0122)	0.0081** (0.0037)	-0.0003 (0.0094)	-0.0122 (0.0135)
Complete higher secondary or above	-0.0714*** (0.0069)	-0.0076*** (0.0017)	-0.0317*** (0.0046)	-0.0024*** (0.0012)	0.0100 (0.0129)	-0.0032** (0.0039)	0.0731*** (0.0108)	0.0333* (0.0143)
Female	-0.1339*** (0.0071)	-0.0137*** (0.0021)	0.0509*** (0.0045)	0.0033*** (0.0011)	0.0950*** (0.0093)	0.0028** (0.0032)	-0.0777*** (0.0075)	0.0732*** (0.0109)
Father (non-agriculture)	-0.0609*** (0.0074)	-0.0065*** (0.0019)	-0.0168 (0.0045)	-0.0007 (0.0011)	0.0785*** (0.0128)	0.0122** (0.0047)	0.0149 (0.0094)	-0.0208 (0.0140)
Mother (non-agriculture)	-0.0129** (0.0064)	-0.0035*** (0.0015)	0.0479*** (0.0052)	0.0055*** (0.0016)	0.0826*** (0.0102)	0.0166** (0.0039)	-0.0187 (0.0076)	0.1176** (0.0116)
Access to bank	0.0022 (0.0079)	0.0041 (0.0023)	0.0131 ** (0.0057)	-0.0002 (0.0012)	-0.0233** (0.0118)	-0.0040 (0.0039)	0.0104 (0.0093)	0.0024 (0.0137)
Closeness to market	-0.0027 (0.0072)	-0.0013 (0.0018)	-0.0099** (0.0049)	0.0006 (0.0011)	-0.0056 (0.0111)	-0.0045 (0.0039)	-0.0020*** (0.0085)	0.0256 (0.0127)
Access to transportation	-0.0167** (0.0073)	-0.0014 (0.0018)	-0.0073 (0.0048)	0.0007 (0.0011)	0.0379*** (0.0112)	0.0058 (0.0039)	0.0084 (0.0086)	-0.0273** (0.0130)
Urban	-0.1350*** (0.0063)	-0.0103** (0.0018)	-0.0102 ** (0.0042)	-0.0003 (0.0010)	0.0431*** (0.0103)	0.0115** (0.0038)	0.0160** (0.0077)	0.0852** (0.0119)
2012/2013	-0.0394*** (0.0063)	-0.0151 ** (0.0022)	0.0019 (0.0039)	0.0014 (0.0010)	0.0172* (0.0095)	-0.0039 (0.0033)	0.0484*** (0.0073)	-0.0106 (0.0110)
Observation	584	2113	158	817	904	3862	4461	14,032

***, ** and * indicate significance at the 1%, 5% and 10% level, respectively

Table 8 Earnings estimations based on the distinction between employers and own account individuals

	Agriculture		Manufacturing		Services	
	Employers	Own account self-employed	Employers	Own account self-employed	Employers	Own account self-employed
Age	0.0554 (0.0392)	-0.0874 (0.1716)	-0.0807 (0.0624)	-0.0001 (0.0001)	-0.0018 (0.0192)	-0.0056 (0.0760)
Primary or incomplete secondary	0.4999* (0.4793)	0.03082* (0.0072)	0.1669 (0.5848)	-0.0003 (0.0055)	-0.0839 (0.2069)	0.4451 (0.5650)
Complete higher secondary or above	-0.2799 (0.2348)	0.3282 (0.3320)	0.2872 (0.5629)	-0.1222 (0.0742)	0.7377*** (0.1738)	0.0379*** (0.5937)
Female	-0.8532*** (0.0637)	-0.2134 (0.4205)	0.5863 (0.6669)	-0.1430 (0.1298)	-1.2301** (0.3651)	-0.7864** (0.0345)
Urban	0.1095 (0.4860)	-0.6791 (0.1000)	-0.6505 (0.7781)	-0.0220 (0.6605)	0.1031 (0.2396)	-0.9866 (2.2542)
2012/2013	0.3009** (0.1380)	0.3017 (0.4761)	-0.2802 (0.1747)	0.4111 (0.9534)	0.0220 (0.0662)	0.5499*** (0.2125)
M1	0.4706 (0.4456)	-2.3913 (0.1859)	-3.3413 (0.1014)	0.20002** (0.0218)	-0.5739 (1.7323)	0.8591 (0.7740)
M2	0.5717 (0.4764)	0.5920** (0.4470)	-0.3181 (0.1157)	-0.1111 (0.1705)	-0.7443 (2.0703)	0.0958 (0.9288)
M3	-0.9032 (0.8103)	-0.1010** (0.0399)	1.6300 (1.5531)	-0.0002 (0.0028)	2.2743 (2.3877)	-3.1771 (3.4980)
M4	2.7897 (3.0097)	-0.2414 (0.2486)	2.2698 (2.7123)	0.1327 (0.1117)	-5.1669 (1.7868)	2.2098 (1.2363)
M5	-0.7729* (0.1053)	1.4206 (0.9317)	2.5761 (0.9839)	-0.3333 (0.0234)	-2.1881** (0.9639)	1.3872 (0.8971)
M6	4.91071 (3.0744)	0.9741 (0.8949)	-1.6417** (2.4463)	-0.2112** (0.6796)	7.283812 8.9375	-6.978887 (0.8477)
M7	-2.040455 (3.8312)	-0.3170 (0.5340)	-0.5405 (0.0390)	-0.0470 (0.0039)	-1.03252 1.9711	3.0791 (0.3011)
M8	-4.2663 (3.4475)	0.5549 (0.4883)	2.0973 (2.8603)	-0.6222 (0.2115)	-1.03252 1.9711	3.2402 (1.0088)
Cons	3.9866 (4.7362)	-3.6428 (2.0623)	5.7817 (4.8998)	0.7210 (0.0271)	2.7858*** (2.4873)	3.6006 (2.7126)
R-squared	0.1049	0.6223	0.3847	0.3875	0.194	0.3476
Observation	584	2113	158	817	904	3862

***, ** and * indicate significance at the 1%, 5% and 10% level, respectively

Table 9 Small-Hsiao tests for IIA assumption related to Table 2

Small-Hsiao tests of IIA assumption						
Omitted	lnL(full)	lnL(omit)	chi ²	df	P > chi ²	Evidence
1	-25,200		51.843	36	0.142	For Ho
2	-35,400		34.111	36	0.559	For Ho
3	-25,800		46.719	36	0.109	For Ho
4	-27,300		40.86	36	0.265	For Ho

Table 10 Small-Hsiao tests for IIA assumption related to Appendix Table 7

Small-Hsiao tests of IIA assumption						
Omitted	lnL(full)	lnL(omit)	chi ²	df	P > chi ²	Evidence
1	-5363.931	-5332.929	62.005	72	0.794	For Ho
2	-6791.604	-6760.873	61.46	72	0.808	For Ho
3	-6185.564	-6156.299	58.529	72	0.874	For Ho
4	-7058.544	-7029.316	58.457	72	0.875	For Ho
5	-4566.581	-4534.496	64.171	72	0.733	For Ho
6	-6615.146	-6585.604	59.085	72	0.863	For Ho
7	-5361.787	-5332.918	57.736	72	0.889	For Ho

credence to an institutional change-driven holistic approach to economic development that creates space for positive synergies between skill generation, on the one hand, and innovation enhancing entrepreneurial activities, on the other. This is consistent with the idea of entrepreneurial and national self-discovery, which provides a broader and more flexible analytical framework than those categorising the links between entrepreneurship and development in concrete stages and proposing one-size-fit-all policy answers.

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