"Romanticizing Penniless Entrepreneurs?"

The Relationship between Start-Ups and Human Wellbeing across Countries

ABSTRACT.

We study the effect of entrepreneurship and its allocation between necessity and opportunity entrepreneurship on three indicators of countries' wellbeing: monetary wellbeing, non-monetary wellbeing and our own indicator of a country's ability to translate economic growth into non-monetary wellbeing. We take into consideration that there is a feedback effect from monetary and non-monetary wellbeing to entrepreneurial allocation. Using data from the Global Entrepreneurship Monitor we establish that opportunity entrepreneurship may raise wellbeing, and also that better wellbeing may raise opportunity entrepreneurship. Hence, entrepreneurship matters for wellbeing in a broad sense, and wellbeing matters for entrepreneurship.

INTRODUCTION

Whether policies can indeed improve entrepreneurship in developing countries, and whether more and better entrepreneurship will lead to better development outcomes have long been matters subject to controversy (Leff, 1979; Naudé, 2010, 2011). At the basis of this controversy are divergent views with respect to the nature of entrepreneurship in developing countries. Here, the vast majority of entrepreneurs are active in micro and small enterprises (MSEs) with a significant proportion of them in the informal sector (Gollin, 2008; Maloney, 2004; Naudé, Gries, Wood & Meintjes, 2008; Nichter & Goldmark, 2009). Many scholars see these as being founded out of necessity (for survival) due to failures in formal labour markets, and conclude that such entrepreneurs make little contribution to poverty alleviation and growth overall – also implying that their contribution towards raising resilience is little. Hence, Banerjee and Duflo (2007, p. 162) warn, "it is important not to romanticize these penniless entrepreneurs". Others have also been dismissive of developing country entrepreneurship and thus of support to MSEs. Schramm (2004, p. 105), for example, describes MSE support programmes as involving "cottage industries that add little to the economy in terms of productivity or growth" and Baumol, Litan,

and Schramm (2007, p. 3) seems to reject any notion of MSEs as growth engines, stating that "if economic growth is the object of interest, then it is the *innovative entrepreneur* who matters".

On the other hand, many consider MSEs, including informal and "survivalist" entrepreneurs important for poverty alleviation and for growth. De Soto (1989) highlights the importance of the informal sectors in a weak institutional environment. Maloney (2004, p. 1159), for example, argues that "we should think of the informal sector as the unregulated, developing country analogue of the voluntary entrepreneurial small firm sector found in advanced countries, rather than a residual comprised of disadvantaged workers rationed out of good jobs". Nichter and Goldmark (2009, p. 1453) reports evidence from a survey of 28,000 MSEs in Africa and Latin America where employment growth in the sector averaged almost 17 per cent per year. Bargain and Kwenda (2010) mention that earnings in the self-employment sector are often better than in the formal salaried sector in many developing countries, and highlights Mexico as an example. In China, the rapid rise in the number of small, private entrepreneurs by more than 30 million over the period 1988 to 1995 has been identified as an important contributor to rapid growth and declining poverty (Mohapatra, Rozelle & Goodhue, 2007, p. 163) and to exports (Naudé & Rossouw, 2010). Voeten, Haan and de Groot (2009) emphasises the innovativeness of MSEs in developing countries[1], while many scholars have noted innovative behaviour and rapid adoptions of new innovations by small-scale entrepreneurs in developing countries[2]. And with the majority of MSEs in developing countries being owned by women, their positive contribution to female empowerment and to the health and welfare of households of women entrepreneurs have been

[1]. Voeten et al. (2009:2) presents empirical evidence showing that "in northern Vietnam, several clusters of small producers engaged in traditional crafts have introduced new technologies, new products and applied new business practices in recent years, expanding their sales on domestic and international markets."

[2]. Feder, Just and Silberman (1985) report various studies that have found a very rapid adoption of high yield varieties of grains by developing country small farmers after the Green Revolution.

noted[3] (Kevane & Wydick, 2001; Minniti & Naudé, 2010). More recently, Amorós and Cristi (2011) studied the relationship between entrepreneurship and income poverty (monetary wellbeing) establishing that entrepreneurship has a positive effect on poverty reduction and that this effect is relatively larger in developing countries.

We do not necessarily aim to settle this controversy here. Rather we wish to add two fresh perspectives to the debate that we hope will contribute to a greater convergence of views on the role and importance of entrepreneurship in developing countries, and to the refinement of entrepreneurship policies. The first of these perspectives relates to the concept of development, and the second to the perceived instrumental nature of entrepreneurship. We believe that differences in how these are understood shape the different views outlined. Many studies on the topic tend to take a restricted view of development – in entrepreneurship studies it is almost exclusively associated with economic growth, productivity growth, per capita income and/or employment growth (Nyström, 2008). Because these studies find mixed evidence of a strong impact of entrepreneurship on growth, and fail to show that "necessity" entrepreneurship or self-employment matter for growth or per capita income, the conclusion is often that the distinction between necessity/informal entrepreneurship and/or self-employment is not vital for economic development in developing countries. Little is said about the relationship between entrepreneurship and broader indicators of human wellbeing. It is seldom considered that entrepreneurship may be a goal in itself, or contribute to non-monetary wellbeing (Gries & Naudé, 2011).

[3] As Maloney (2004, p. 1162) implies, a substantial proportion of people in the informal and MSE sector in developing countries may be there *not* out of necessity, but because of choice, stating that "the disproportionate representation of women in informal self-employment may also again be found in certain desirable characteristics of the sector, particularly flexibility".

Our position is hence that development is a multi-dimensional concept, and that the interest ought to be not only on the impact of entrepreneurship on "income poverty", but also on non-monetary human wellbeing. In the next section, following Gries and Naudé (2011) we derive a number of implications and hypotheses, which we subject to empirical analysis in the remainder of the paper. We use data from the Global Entrepreneurship Monitor (GEM) covering the period 2001 to 2010 to determine the relationship between entrepreneurship and monetary and non-monetary wellbeing measures. By considering causality, we aim to investigate the extent to which improvements in monetary and non-monetary wellbeing can contribute to entrepreneurship, and hence whether or not the instrumental view of entrepreneurship is restrictive.

DEVELOPMENT AS HUMAN DEVELOPMENT

Just over twenty years ago the Human Development Index (HDI) was launched by the United Nations. This index was intended to provide a single measure to capture the fact that human development is a multidimensional concept, and that it cannot be reduced to monetary measures such as GDP or a poverty line. Therefore, the HDI includes indicators of literacy and life expectancy in addition to per capita income. While there are many criticisms of the HDI (see, for example, Naudé, Santos-Paulino & Gillivray, 2009) and it is still agreed that it does not satisfactorily capture the complexity of human wellbeing, it did mark an important shift in global views on human development. Importantly in this regard, it reflected the growing acceptance of Amartya Sen, Martha Nussbaum and others' arguments that human development should be about broadening people's capabilities .

In the Capabilities Approach (CA), as this came to be known, human development is about people having "the freedoms (capabilities) to lead the kind of lives they want to lead, to do what

they want to do and be the person they want to be". Once they effectively have these freedoms, "they can choose to act on those freedoms in line with their own ideas of the kind of life they want to live" (Robeyns, 2003, p. 7). In this light, human development has been defined "as a process of enlarging people's choices" (UNDP, 1996, p. 49). These choices, or capability set *(Q),* can be written as $Q=\{f(g(x))\}$, which indicates that capabilities consist of various functionings $f(.)$, where the extent of functionings depend on the resource vector ($g(x)$). The term *functionings* is central in the CA, and refers to "valuable activities and states that make up people's wellbeing" (Alkire, 2005, p. 1) and includes "working, resting, being literate, being healthy, being part of a community, being respected" (Robeyns, 2003, p. 6). Gries and Naudé (2011) argue that being entrepreneurial is also a functioning, as it can be valued in itself (more discussion below). The function f will determine the extent to which resources or abilities can be turned into functionings – including functionings which improve a person's or even a country's overall improvement to multidimensional poverty. Here, since we will be using data on entrepreneurship at a country level, we will consider the functionings that are related to social development. For our purposes, the function f, and the link it creates between entrepreneurship and social development, is important for two reasons:

First, because entrepreneurship, apart from being a process, is also a resource, the extent to which it will allow human functionings in other areas also depends on the function f. In some societies, a particular level of entrepreneurial capital may be translated much more efficiently into human functionings. How and why this is so are, however, neglected questions. As we pointed out in the introduction, until now the interest has been mainly in how entrepreneurship, as a resource, facilitates economic growth. In the remainder of the paper we will be concerned

with establishing the extent to which entrepreneurship contributes to and facilitates human functionings – for instance in whether it improves any non-monetary dimensions of wellbeing.

Second, if being entrepreneurial is to be a functioning, then resources and abilities must be available, and these must be translated into the outcome of being entrepreneurial (and achieved functioning). Across the world it is noticeable that, irrespective of how we measure the act of being entrepreneurial (whether as self-employment, business ownership, start-up activities or innovation) there are significant variations in the availability of resources and abilities, as well as in the effectiveness with which resources and abilities are translated into entrepreneurial outcomes. In this paper our main interest is not in the factors determining this effectiveness, but rather in the implication of entrepreneurship as an end in itself, because entrepreneurial activities can be a human functioning. This would suggest that resources and other functionings, such as those that result from human development, will be driving entrepreneurship. In an environment characterized by high development, more people may be able to choose to be entrepreneurial. Hence in the remainder of the paper we will also be concerned with investigating the direction of the causality between entrepreneurship and human development.

Entrepreneurship and human development

What is the role of entrepreneurship in economic growth and human development? Although Adam Smith "detested" businessmen, the creation and growth of business firms is widely seen to be necessary for economic growth and human development. The former has been explicit in economics for at least a century, following Schumpeter's work "The Theory of Economic Development" (1912). The potential importance of entrepreneurship for economic growth and human development flows from the central functions ascribed to the entrepreneur. These include innovation (Schumpeter, 1912), the reallocation of production factors from less productive to

more productive uses (Ács & Storey, 2004; Audretsch & Keilbach, 2004), the provision of gap-filling and input-completing functions (Leibenstein, 1968), providing incentives for investments in human capital formation (Kwon & Arenius, 2010), a cost-discovery function (Hausmann & Rodrik, 2003) and improvement of the general business and governance environment in a country through "institutional entrepreneurship" (Li et al., 2006).

These "growth and development" functions can benefit growth and development on both a micro and a macro level. On a micro level, it can contribute to improve firm efficiency, more opportunities for new firm establishment, growth in employment, higher and more stable and diversified household incomes, higher tax revenue for governments, and improvements in governance. On a macro level, these micro-level achievements could result in greater economic resilience and better aggregate outcomes as measured in terms of competitiveness, peace and stability, and political freedoms. Hence, entrepreneurs can be argued to be necessary for expanding societies' freedoms and choices including better health and education outcomes. Where these lack the supply of entrepreneurship is often diagnosed to be inadequate (Iyigun & Rodrik, 2004; Schulpen & Gibbon, 2002).

But the performance of these key entrepreneurial functions will not automatically lead to either growth or human development. And even if it does lead to economic growth, economic growth does not automatically imply improved human development. The latter will require growth to be sustainable, shared, and improving people's positive freedoms. Thus, innovation may bring benefits, both for growth and human wellbeing (for example, through the development of new medicines) but can also retard growth and limit human development (e.g. development of weapons) or just be ineffectual for broader development. Likewise, entrepreneurs do not automatically reallocate scarce resources towards their most productive uses and rather they do

so towards their most profitable uses, which as the 2008 global financial crisis has shown, can involve the creation of asset price bubbles rather than productive investment. And very often, high growth is accompanied by growing inequality of income and wealth, environmental damage, corruption and conflict, with little impact in terms of better governance and on expanding people's freedoms.

Hence, *a priori* the relationship between the total supply of entrepreneurs on economic growth and human development is ambiguous. This has been stressed by Baumol (1990) who argued that the allocation of entrepreneurship matters more than its supply. It is what entrepreneurs do what matters. Accordingly, a growingly literature has examined various types of entrepreneurship and its measurement. For example, the GEM project makes a distinction between necessity (NEC) and opportunity entrepreneurship (OPP), where the former is start-up activity which is the result, according to the entrepreneur, of a lack of any better opportunities in the labour market. Whereas empirical evidence has been mixed on the impact of total start-up activities on economic performance, a number of studies do find a positive impact of productive opportunity-type entrepreneurship, thus tending to confirm Baumol's (1990) thesis that the type or allocation of entrepreneurship may matter more[4].

However, we are also interested in the general relationship between entrepreneurship and human development. This is because the supply and the allocation of entrepreneurship, which will ultimately matter for development, is itself influenced by human development. Thus, a growing body of research notes the importance of governance, of freedom, of human capital – often subsumed under the heading 'institutions'— on entrepreneurship. More recently the existence of this two-way relationship has been implicit in a growing awareness that the relationship between

[4] Opportunity-based entrepreneurs could be a proxy for Baumol's productive entrepreneurial activities, but some "business opportunities" can incorporate any type of entrepreneurial activity, including self-employment, and this can involve low-growth or no-growth entrepreneurship. More discussion see Minniti (2008).

entrepreneurship and economic growth differs across the level of a country's development (Ács & Szerb, 2009; Ács & Naudé, 2011, Amorós, 2011). This suggests that *a priori* there could be a negative relationship between changes in the supply of entrepreneurship: at low levels of development, a higher total supply of entrepreneurship is needed to fulfil gapping-filling, input-completing and cost-discovery functions, which will mean that the rate of new firm entry (new start-ups) should be high, whereas at higher levels of development, smaller marginal changes in the stock of entrepreneurship is needed to push out the production possibilities frontier.

Based on this discussion, we can now put forward three hypotheses.

HYPOTHESES DEVELOPMENT AND RESEARCH METHODOLOGY

Hypotheses

Based on the discussion so far, we can state that there is bi-directional causality between monetary (strictly economic) and non-monetary measures of wellbeing and entrepreneurship allocation. The sign and strength of the causality depends on the motivation for entrepreneurship, whether it takes place to utilise an opportunity or out of necessity. Moreover, there is also a bi-directional causality between the motivation for entrepreneurship and monetary and non-monetary measures of wellbeing.

This suggests the following hypotheses:

> *Hypothesis 1: Monetary and non-monetary human wellbeing, as well as a country's ability to increase non-monetary wellbeing when GDP grows, depend on its level of entrepreneurship.*

Hypothesis 2: Opportunity entrepreneurship will cause greater levels of monetary and non-monetary human wellbeing, as well as greater ability to increase non-monetary wellbeing, whereas necessity entrepreneurship will do the contrary.

Discussion: Where people are forced into entrepreneurship, they may be unable to improve dimensions of their non-monetary wellbeing such as obtaining education or maintaining or improving health. Non-monetary dimensions of wellbeing would therefore suffer in the absence of human agency. On the other hand, improving human capabilities by adding human functionings such as education and health will contribute to facilitate people becoming opportunity entrepreneurs – which will in turn have a positive impact also on monetary wellbeing (GDP).

Increases in human capabilities are often the outcome of greater public investment that accompanies growth in GDP (although the relationship is not always strong or linear).

Hypothesis 3: Higher levels of non-monetary and monetary wellbeing in a country are associated with increases in opportunity (OPP) relative to necessity (NEC) entrepreneurship.

Discussion: We expect that both monetary and non-monetary wellbeing indicators will influence the rate of start-ups and its typologies (opportunity or necessity-based). Thus, at lower levels of wellbeing the rate of necessity entrepreneurship will be high, while at higher levels of wellbeing, opportunity entrepreneurship will be more predominant than necessity entrepreneurship.

Data and Variables

Entrepreneurship: Our data is obtained from the GEM project database, which provides harmonized, internationally comparable data on entrepreneurial activity at country level. By the

end of 2010, 84 different economies had participated in GEM. Among them, 54 countries could be classified as developing economies (low- and middle-income countries). The GEM project (Reynolds, Bosma, Autio, Hunt, Bono, Servais, Lopez-Garcia & Chin, 2005) estimates the percentage of adult population (people between 18 and 64 years old) that are actively involved in starting a new venture like a nascent entrepreneur or as an owner –manager of a new business with no more than 42 months. This rate is referred to as the Early-stage Entrepreneurial Activity Index (TEA). The TEA rate can be disaggregated according to the main two motives that entrepreneurs "follow": i) opportunity (OPP), that is, taking actions to create a new venture pursuing perceived business opportunities, and ii) necessity (NEC), as the only way they see possible to earn a living.

Empirical evidence shows that NEC rates are higher in low- to middle-income countries (Ács & Amorós, 2008; Amorós & Cristi, 2011; Bosma, Ács, Autio, Coduras & Levie, 2009; Wennekers, van Stel, Thurik & Reynolds, 2005). Although, GEM data is available from 2000 we used data from 2001 to 2010. This is because on year 2000 GEM project does not include data on OPP and NEC.

Development Indicators: we use the Human Development Index (HDI) to build proxies for non-monetary wellbeing and a country's ability to translate economic growth into non-monetary wellbeing (this latter is our own index of wellbeing –more on this below). HDI is calculated by the United Nations Development Programme (UNDP) and publishes this measure in the Human Development Reports[5]. The HDI is a composite index that measures average achievement in a country by evaluating three dimensions of human development: life expectancy at birth (long and healthy life), adult literacy rate (education and knowledge) and GDP per capita in purchasing

[5]. For more information on the methodology of HDI, see the most recent Human Development Report 2011, technical notes (UNDP, 2011, p.167).

power parities (decent standard of living). The HDI takes values from 0 to 1, where 1 stands for the highest attainment. The dimensions of the HDI reflect major concerns in the study of development and poverty reduction (Chen & Ravallion, 2008; Misturelli & Heffernan, 2008).

Our proxy for non-monetary wellbeing is the per-country simple average of the life expectancy and literacy rates used to calculate the HDI. We label this variable as the life-literacy wellbeing index (*LEWI*) and it has values running from 0 to 1, where 1 indicates the highest level of life expectancy and literacy rate.

Our proxy (or index) for a country's ability to translate economic growth into non-monetary wellbeing is based on the difference among countries to reach higher levels of HDI for a given GDP per capita. We argue here, following Naudé et al. (2009) that this is an important, but neglected, dimension of wellbeing – because growth in monetary wellbeing does not always improve non-monetary wellbeing, but do so in some cases – so that the concepts are interrelated. From an empirical point of view the ability of countries to translate monetary gains into non-monetary gains can be measured at country level by calculating the deviation of its HDI from the predicted value for HDI given its GDP per capita. We label this measure the HDI Intervention Index (HDIII) because it indicates whether countries may need more than just increases in per capita income to improve human wellbeing. The measure follows directly from the preceding observations and it is obtained by estimating the following equation for HDI:

$$HDI_{it} = \chi_0 + \chi_1 g(GDP_{it}) + \varepsilon_{it} \quad (1)$$

Where, χ_0 is an intercept term, χ_1 is a slope coefficient, *g(GDP)* is some transformation of per capita income and ε is an error term. The transformation of income is based on the recognition that the relationship between HDI and per capita income may be non-linear. We use the Box-Cox transformation to allow the data to determine what functional form is more appropriate. This Box –Cox transformation is:

$$g(GDP_{it}) = \frac{GDP_{it}^{\lambda} - 1}{\lambda} \tag{2}$$

where λ is an unknown parameter.

Then we replace (2) in (1) and we obtain the maximum likelihood estimates for χ_0, χ_1, and λ ($\hat{\chi}_0$, $\hat{\chi}_1$ and $\hat{\lambda}$). Results for these estimates are presented in Table 1.

"Insert Table 1 Here"

The results indicate that λ is statistically significant at 5% and its point estimate is -0.07. Moreover, transformed GDP is statistically significant and as it increases, the value of the HDI also increases.

Once we get the parameter estimates we compute the predicted value of HDI given a value of GDP (it is also the conditional expected value of HDI given GDP) as:

$$E\left[HDI_{it} / GDP_{it}\right] = \hat{\chi}_0 + \hat{\chi}_1 g\left(GDP_{it}\right) \tag{3}$$

Our *HDIII* is then obtained as the difference between that predicted value and the sample value for HDI:

$$HDIII = HDI_{it} - E\left[HDI_{it} / GDP_{it}\right]. \tag{4}$$

When for a specific country $HDIII > 0$, then $HDI_{it} > E\left[HDI_{it} / GDP_{it}\right]$, which implies that this country has a value of HDI greater than the one expected given its GDP. Thus when we compare countries we say that those with positive values of HDIII have greater ability to translate economic growth into no-monetary wellbeing than those with negative HDIII. Hence, the country with the most positive (most negative) value for HDIII is the one that translates economic growth into non-monetary wellbeing the best (worst).

To capture the economic effects and qualifying the economic environment that shapes entrepreneurial activities (Wennekers et al., 2005) we include GDP per capita adjusted by purchasing power parity (PPP) in international U.S. dollars. Data is sourced from the IMF's World Economic Outlook databases.

The Annex shows the list of countries that have been involved in GEM project 2001-2010.

Proposed model and estimation procedures

To model the relationship among a country's entrepreneurship, non-monetary wellbeing, monetary wellbeing, and ability to translate economic growth into non-monetary wellbeing, we propose the following set of equations

$$HDIII_{it} = \varphi_0 + \varphi_1 TEA_{it} + \varphi_2 TEA_{it} \times \left[\frac{OPP_{it}}{NEC_{it}}\right] + \varphi_3 LEWI + \varphi_4 LEWI_{it} \times \left[\frac{OPP_{it}}{NEC_{it}}\right] + \mu_{it} \tag{5}$$

$$LEWI_{it} = \theta_0 + \theta_1 TEA_{it} + \theta_2 TEA_{it}^2 + \theta_3 TEA_{it} \times \left[\frac{OPP_{it}}{NEC_{it}}\right] + \pi_{it} \tag{6}$$

$$GDP_{it} = \delta_0 + \delta_1 TEA_{it} + \delta_2 TEA_{it}^2 + \delta_3 TEA_{it} \times \left[\frac{OPP_{it}}{NEC_{it}}\right] + \nu_{it} \tag{7}$$

$$\left[\frac{OPP_{it}}{NEC_{it}}\right] = \beta_0 + \beta_1 GDP_{it} + \beta_2 GDP_{it}^2 + \beta_3 LEWI_{it} + \beta_4 LEWI_{it}^2 + \omega_{it} \quad (8)$$

Equations (5), (6) and (7) follow from hypotheses 1 and 2. Equation (8) follows from hypothesis 3. The vectors of parameters φ, θ, δ and β are unknown and the vectors π, ν, μ and ω represent stochastic error terms.

Equations (5), (6) and (7) include the term $TEA_{it} \times \left(\frac{OPP_{it}}{NEC_{it}}\right)$ to analyze whether or not the contribution of TEA on monetary and non-monetary wellbeing as well as on the country's ability to translate increases in per capita GDP into non-monetary wellbeing, depends on the allocation of TEA between OPP and NEC. Accordingly to our hypothesis 2, we expect a positive sign for parameters φ_2, θ_3 and δ_3, which would confirm that the contribution of TEA is positively related to opportunity entrepreneurship.

Equation (5) also includes LEWI to account for possible effects of life expectancy at birth and adult literacy on the on country's ability to translate increases in per capita GDP into non-monetary wellbeing. Moreover, we added the variable LEWI x OPP/NEC to allow for the possibility that the effect of LEWI upon HDIII depends on the allocation of TEA between OPP and NEC.

Equation (8) follows from hypothesis 3 that indicates that, as monetary and non-monetary wellbeing increase, opportunity entrepreneurship (OPP) will be more predominant than necessity entrepreneurship (NEC).

Equations (6) and (7) include the squared value of TEA, whereas equation (8) includes the squared value of GDP and LEWI. This allows for nonlinear relationships between the dependent

variables and the regressors.

We implement our estimations on the observations pooled across countries and years because our panel data is strongly unbalanced: more than 45 per cent of the countries have four or less observations. By doing this we add to the error term of each equation the unobserved country characteristics, which may be constant over the period under study, and this creates a composite error term. This may cause correlation between the regressors and the error term of each equation, because some of the regressors may be correlated with the unobserved effect that is included in the composite error term.

Moreover, endogeneity problems of regressors may also arise because the already mentioned possible existence of bi-directional causality between monetary and non-monetary measures of wellbeing and entrepreneurship.

To overcome these problems between regressors and the error terms, we use an instrumental variable approach that uses instruments for the regressors that are correlated with the error (Wooldridge, 2002, Section 10.1).

Even if the above approach addresses the endogeneity problem, the composite error term may be serially correlated and may have heterogeneous variance due to the presence of the unobserved effect. Therefore, we implement the instrumental variable approach using generalized method of moments (GMM) which is more efficient than the simple Instrumental Variable (IV) estimator when heteroskedasticity is present (Baum, Schaffer & Stillman, 2003). We use the GMM continuously updated estimator (CUE) of Hansen, Heaton and Yaron (1996)[6]. Moreover, we combine this procedure with the "sandwich estimate" of the covariance matrix (known as the

[6] In Monte-Carlo experiments this method demonstrated a better performance than the traditional two-step GMM (Hansen et al., 1996).

robust covariance matrix estimator)[7] and the error terms are allowed to be correlated within countries (clustering). This method produces consistent and efficient estimates and statistics robust to arbitrary heteroskedasticity and intragroup correlation such as serial correlation[8].

To implement the GMM method we use a set of *institutional variables* as instruments. These variables are related to the governance and general business environment in each country. One of these variables comes from the World Bank's Worldwide Governance Indicators (WGI). We utilize from WGI the variable *Government Effectiveness* (Gef) defined in exact terms according to Kaufmann et al. (2008, pp. 7–8) as measuring perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures. In the WGI this variable ranges between -2.5 and 2.5, with the higher scores corresponding to better outcomes. More effective governments may be associated with lower costs of starting new businesses. More effective governments may also reduce the need for people to enter the informal economy and so reduce necessity entrepreneurship.

The other variables that we use come from the annual Index of Economic Freedom produced by The Wall Street Journal and The Heritage Foundation that tracks economic freedom around the world. The Index covers 10 freedoms –from property rights to entrepreneurship. Here we use two of the components of the total *Economic Freedom Index*: *Property Rights* (Pr) *and Government Size* (Gs). Property rights have a strong relationship with the development of specific entrepreneurial activities: "Secure property rights give citizens the confidence to undertake commercial activities, save their income, and make long-term plans because they know that their income and savings are safe from expropriation or theft. The protection of private property requires an effective and honest judicial system that is available to all, equally and

[7] Eicker (1967) and Huber (1967) introduced these "sandwich estimators".
[8] We accomplish this estimation procedure in STATA with ivreg2 and the cue, robust and cluster options.

without discrimination" (Miller & Holmes, 2009, pp. 14-15). Government size may be taken as an indicator of the coverage and extent of governmental provision of basic services, such as education and health. It can also be interpreted as an indicator of the tax and regulatory burden on entrepreneurs. The Index methodology uses a scale from 0 to 100, where 100 indicates the highest degrees of freedom.

Unfortunately, there are not data on Property Rights and Government Size for 2001. This implies that part of our empirical analysis covers the period from 2002 to 2010[9].

Table 2 shows the descriptive statistics and correlation matrix of the full set of variables used in the estimation process.

"Insert Table 2 Here"

RESULTS

As we previously indicated, in all our equations we use Government Effectiveness (Gef), Property Rights (Pr) and Government Size (Gs), their squares and cross products as instruments.

We first test for heteroskedasticity in each equation using the Pagan and Hall (1983) test. Under the null hypothesis of homoskedasticity the Pagan-Hall test is distributed as a chi-squared. We implement this test estimating each equation with IV. The results from this test will indicate whether we use IV or GMM. In cases where homoskedasticity is rejected, we test the exogeneity of the regressor with the GMM distance statistics[10] ("C" test), which is appropriate in the context of an efficient GMM estimation (Baum et al., 2003). This statistic is distributed chi-squared under the null hypothesis that the specified orthogonality conditions are satisfied, with degrees of freedom equal to the number of these conditions[11].

[9] As we mentioned before, on the year 2000 the GEM project estimated TEA but not OPP or NEC.
[10] More details about this test can be found in Wooldridge (2002, Section 8.5) and in Baum et al. (2003).
[11] This test is implemented in STATA with the orthog option of ivreg2.

Results of heteroskedasticity tests indicate that we should reject the hypothesis of homokedasticity at 1 per cent in the equation for HDIII, at 10 per cent in the equation for LEWII, at 5 per cent in the equation for GDP, and at 1 per cent in the equation for the ratio between OPP and NEC. These results suggest the appropriateness of using our GMM estimator.

The C-test of exogeneity for the regressors in the equation for HDIII indicates that we can strongly reject the hypothesis that TEA, TEA x OPP/NEC and LEWI x are jointly exogenous. In the equations for GDP and for LEWI we do reject that TEA and TEA x OPP/NEC are jointly exogenous. In the equation for the ratio between OPP and NEC we can reject the hypothesis that GDP and LEWI are jointly exogenous. These results further suggest the appropriateness of the GMM estimation.

Finally, in each equation we verified the rank condition and tested for the orthogonality of the included and excluded instruments, and whether or not the excluded instrument are correctly excluded in each equation. For the latter we use the Hansen's (1982) *J*-statistics that is a test of over-identifying restrictions. The joint null hypothesis is that the instruments are valid instruments, i.e., uncorrelated with the error term, and that the excluded instruments are correctly excluded from the estimated equation. This Hansen's *J*-statistic is consistent in the presence of heteroskedasticity and autocorrelation. All these tests support the selection that we made of included and excluded instruments in each equation.

Table 3 shows the estimates for each equation using a GMM continuously updated estimator (CUE) combined with the "sandwich estimate" of the covariance matrix and clustered errors.

"Insert Table 3 Here"

The results for the equation of HDIII indicate that as a country's opportunity entrepreneurship, level of life expectancy at birth, and adult literacy rate (LEWI) increases, the better a country seems to be able to transform GDP gains into non-monetary wellbeing. This result is consistent with our hypothesis 1. Also, the ratio between OPP and NEC reduces the impact of TEA upon HDIII whereas it increases the impact of LEWI on HDIII. This result partially supports our hypothesis 2.

The results for the equation of the composite index of level of life expectancy at birth and adult literacy rate (LEWI) indicate that there exists an inverse relationship between TEA and LEWI up until a certain threshold, after which increases in TEA are associated with a higher level of LEWI i.e. a "U-shaped" relationship. This result is consistent with our hypothesis 1. Moreover, the coefficient of the variable TEA x OPP/NEC has a positive sign, indicating that the effect of TEA upon LEWI is positively associated with the ratio between OPP and NEC. This result supports our hypothesis 2.

The results for the GDP equation suggest that entrepreneurial activity improves a country's GDP but only when OPP is several times higher than NEC (our point estimate indicates that OPP has to be at least 2.4 times greater than NEC). These results support hypotheses 1 and 2. In this equation the squared value of TEA is not statically significant.

Finally, estimates of the equation for the ratio between OPP and NEC show that GDP is statistically significant whereas LEWI is not. Moreover, GDP is associated with increases in opportunity relative to necessity entrepreneurship. This provides partial support to our hypothesis 3. We have to point out that this may be due to the strong correlation between GDP and LEWI (sample correlation is 0.74). As a consequence the standard error of the estimator for LEWI tends to be large and the test of the hypothesis that the coefficient equals zero leads to a failure to reject

the null hypothesis. In fact, the estimation of the equation for OPP/NEC including only LEWI and its squared value illustrates that LEWI affects the OPP/NEC ratio. More specifically, there exists an inverse relationship between OPP/NEC and LEWI until some threshold, after which increases in LEWI are associated with a higher level of OPP/NEC. This finding supports our hypothesis 3.

CONCLUSIONS

We concur that "penniless" entrepreneurs (or necessity entrepreneurs in the terminology of the GEM) should not be "romanticised". Following the capability approach to human wellbeing and poverty, we argued that if the relationship between entrepreneurship and development is to be correctly understood, empirical analyses need to be broadened to focus also on non-monetary measures of development. In this paper we did this by considering the relationship between measures of start-up entrepreneurship that allows for various types of entrepreneurship, and measures of non-monetary wellbeing. Our empirical findings could not reject our two hypotheses, suggesting that the empirical evidence is supportive of the capabilities approach to human development, wherein opportunity entrepreneurship (entrepreneurship as a functioning) contributes to human wellbeing, and where high rates of necessity entrepreneurship suggest a lack of agency.

The policy implications are that poor countries can improve their human wellbeing (both monetary and non-monetary) by facilitating improvements in the allocation of entrepreneurship from necessity entrepreneurship to opportunity entrepreneurship. To the extent that economic growth and development could create opportunities, this would imply that at early stages of development the causality could run from growth and development to entrepreneurship, rather

than the other way around. This also suggests that opportunity entrepreneurship can contribute to non-monetary wellbeing in higher-income countries.

Two caveats need to be pointed out at the close. The first is that our data covers only a relatively short time span and it is more than likely that the beneficial impacts of opportunity entrepreneurship on development outcomes (for which the theoretical and historical cases are strong) only operate on a much longer time horizon. Second, and related to the previous caveat, is the fact that we have only used entrepreneurship indicators measuring marginal changes in the stock of entrepreneurs (i.e. the partial flow). This will not account for the impact of the stock of entrepreneurship on development, and for variations in the stock of entrepreneurship over the course of a country's development. If, at earlier stages of development there is a mismatch between opportunities and the entrepreneurial stock, then the rate of new start-ups may possibly be too high at such stages. This would mean, as Gries and Naudé (2011) recently illustrated, that policy efforts aimed to improve the search of entrepreneurs' efficiency (for instance, via improvements in human capital/education) and the transaction costs in the economy (through institutional reform) would indeed be consistent with human development.

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Table 1: Estimates of the parameters of the Box-Cox transformation in equation of HDI

Variable	Estimates
Lambda	-0.07**
	(0.03)
Transformed GDP	0.2***
Chi-squared value for test H0: $\chi_1 = 0$	1354
Constant	-0.7
Sigma	0.04
LR Chi squared	1354***
Number of observations	704

Standard error between brackets. ***,**,* indicate statistically significant at 1%, 5% and 10%, respectively.

Table 2: Descriptive statistics and correlation for variables used in the estimation of the equations.

Variable	Obs	Mean	S.D.	Min.	Max.	HDI	GDP	TEA	HDIII	LEWI	Gs	Pr	Gef	TEA x OPP/NEC	OPP/NEC	LEWI x OPP/NEC
HDI	704	0.8	0.1	0.4	0.9	1										
GDP	704	19699	13934	1046	58714	0.8	1									
TEA	428	9.6	6.9	1.25	52.1	-0.6	-0.5	1								
HDIII	704	0.0	0.04	-0.33	0.06	0.4	0.0	-0.1	1							
LEWI	704	0.8	0.08	0.52	0.99	1.0	0.7	-0.5	0.5	1						
Gs	687	60.1	24.3	0	95.3	-0.6	-0.5	0.6	-0.2	-0.6	1					
Pr	687	61.2	24.1	0	95	0.7	0.8	-0.4	0.1	0.7	-0.5	1				
Gef	777	41.9	79.5	-143.8	226.7	0.6	0.6	-0.3	0.08	0.5	-0.4	0.7	1			
TEA x OPP/NEC	406	38.0	35.9	3	238.8	0.2	0.3	0.3	0.03	0.2	-0.05	0.3	0.27	1		
OPP/NEC	406	4.7	4.3	0.6	31.6	0.5	0.6	-0.3	0.02	0.4	-0.4	0.5	0.46	0.71	1	
LEWI x OPP/NEC	353	4.5	4.2	0.60	28.8	0.5	0.6	-0.3	0.05	0.5	-0.5	0.5	0.48	0.70	0.9	1

Table 3: Estimates of the parameters of the equations of HDIII, LEWI, GDP and OPP/NEC

	Equation of HDIII	Equation of LEWI	Equation of GDP	Equation of OPP/NEC	Equation of OPP/NEC
TEA	0.004***	-0.02***	-1802*		
	(0.001)	(0.005)	(1023)		
TEA^2		0.0003*	-7.0		
		(0.0001)	(32.1)		
TEAxOPP/NEC	-0.0008**	0.002***	744***		
	(0.0003)	(0.0003)	(145)		
LEWI	0.3***			232	-307**
	(0.08)			(237)	(133)
$LEWI^2$				-168	198**
				(158)	(79)
LEWIxOPP/NEC	0.003*				
	(0.002)				
HDIII					
GDP				0.0008*	
				(0.0004)	
GDP^2				-8.21E-09	
				(5.83E-09)	
Constant	-0.3***	0.9***	14560**	-82	120**
	(0.07)	(0.03)	(7317)	(90)	(56)
Number of countries	64	64	64	64	64
N	328	328	328	328	328
Kleibergen-Paap Rank test Chi-squared	9.8	12.8	11.1	18.2	5.3
P-value	0.08	0.05	0.05	0.003	0.07
Hansen *J'* Statistic Chi-squared	2.1	5.6	3.8	4.5	2.8
P-value	0.7	0.3	0.4	0.3	0.1
Instrumented regressors	TEA, TEAx OPP/NEC LEWIx OPP/NEC	TEA, TEAx OPP/NEC	TEA, TEAx OPP/NEC	LEWI, GDP	LEWI
Included instruments	LEWI	TEA^2	TEA^2	GDP^2, $LEWI^2$	$LEWI^2$
Excluded Instruments	Pr, Gs, Gef, Pr^2, Gef^2, Gs^2, Gef x Gs	Pr, Gs, Gef, Pr^2, Gef^2 , Gs^2, Gef x Pr	Gs , Gef, Pr, Gs^2, Gef^2, Pr^2	Pr, Gs, Gef, Pr^2, Gef^2, Gs^2	Pr, Pr^2

Standard errors between brackets. ***,**,* indicate statistically significant at 1%, 5% and 10%, respectively.

Annex: List of GEM countries, 2001-2010

Algeria
Angola
Argentina
Australia
Austria
Belgium
Bolivia
Bosnia & Herzegovina
Brazil
Canada
Chile
China
Colombia
Costa Rica
Croatia
Czech Republic
Denmark
Dominican Republic
Ecuador
Egypt
Finland
France
Germany
Ghana
Greece
Guatemala
Hong Kong
Hungary
Iceland
India
Indonesia
Iran
Ireland
Israel
Italy
Jamaica
Japan
Jordan
Kazakhstan
Korea Rep.
Latvia
Lebanon
Macedonia
Malaysia
Mexico
Montenegro
Morocco
Netherlands
New Zealand
Norway
Pakistan
Panama
Peru
Philippines
Poland
Portugal
Puerto Rico
Romania
Russia
Saudi Arabia
Serbia
Singapore
Slovenia
South Africa
Spain
Sweden
Switzerland
Syria
Taiwan
Thailand
Tonga
Trinidad and Tobago
Tunisia
Turkey
Uganda
United Arab Emirates
United Kingdom
United States
Uruguay
Vanuatu
Venezuela
West Bank & Gaza Strip
Yemen
Zambia