Institutions, Human Capital and Entrepreneurial Orientation (EO): Implications for Growth Strategy

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January 2017

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Abstract

Motivated by the long established postulation by Adam Smith and Joseph Schumpeter that human capital and institutions enable Schumpeterian entrepreneurship which, in turn, facilitates economic growth, we sought to establish a more robust empirical support for this relationship. Adopting EO (i.e., innovativeness, proactiveness and risk-taking; Mthanti and Ojah, 2017, *Research Policy*, 46:4, 724-739) as the measure of Schumpeterian entrepreneurship at the macro-level, and using a sample of 93 countries, over 1980-2008, we employ system-GMM to investigate institutions and human capital as possible determinants of Schumpeterian entrepreneurship (EO). We find that the human capital—EO nexus is robust across economic development levels. However, there is a cross-country variation in the institutions—EO nexus. In line with theoretical predictions, institutions indeed drive EO in middle-to-high income countries. However, in low income countries, building institutions in order to foster EO yields perverse outcomes, which, for us and especially based on deeper analysis, suggest that improving the quality of institutions may not be a necessary precondition for EO/growth policy in low income countries. Furthermore, we find that EO is a highly persistent series, with self-reinforcing network effects; i.e., lofty EO behaviour encourages more lofty EO behaviour. Overall, therefore, we argue that where Schumpeterian entrepreneurship is hampered by low private returns or poor institutional environment, a sensible growth strategy would be to: (1) invest in human capital and (2) subsidize EO directly to exploit its network effects.

Entrepreneurial orientation, Economic growth, Institutions, Human capital, Policy

Version: January, 2017

1. Introduction

The economics literature suggests that institutions and policy variables are possible antecedents of economic growth because they enable productivity enhancing Schumpeterian entrepreneurship (Acemoglu et al., 2001 and Glaeser et al., 2004) by increasing returns to private endeavour. For instance, strong financial institutions may increase access to funds for Schumpeterian entrepreneurs' innovation and launching of new products to market (Schumpeter, 1912); and consequently, enhancing technological diffusion and growth. Additionally, high levels of corruption may increase uncertainty levels and transactions cost for a Schumpeterian entrepreneur and, as a result, reduce the number of innovative and/or productivity-enhancing opportunities that are exploited (Anokhin and Schulze, 2009). Similarly, differing levels of human capital in middle-to-high income countries explain the cross-country variation in innovation, technological upgrading and thus catching up with the income of advanced countries (Lee and Kim, 2009). Moreover, in a society with distributional conflict (inequality), growth promoting activities such as the accumulation of human capital, and the creation and diffusion of new production knowledge engendered by Schumpeterian entrepreneurship, are likely to be constrained (Persson and Tabellini, 1991).

Based on the preceding insights, it follows that, theoretically, in both the institutions—growth nexus, and the human capital—growth nexus, the implied causal direction is from institutions and human capital to productivity enhancing Schumpeterian entrepreneurship; and only then to growth. However, the broader macro-analysis literature has mainly investigated institutional variables and human capital as direct determinants of economic growth (King and Levine, 1993, Barro, 2000, Acemoglu et al. 2001 and Glaeser et al. 2004); and not necessarily as enablers of Schumpeterian entrepreneurship. Yet, these variables are theorised to facilitate growth either: (1) indirectly, by increasing the private appropriation of returns to Schumpeterian entrepreneurship through effectively securing property rights (Knack and Keefer, 1995), and/or (2) directly, by enabling learning and the diffusion of that learning (Devereux and Smith, 1994).

Nevertheless, scholars tend to just link institutional and human capital variables to growth instead of establishing the causal link between growth and the hypothesized channel to growth – i.e., Schumpeterian entrepreneurship. This omission, in our view, may partially emanate from the tenuous` relationship, in empirical analyses, between entrepreneurship – defined as entry density/small business activity[1] – and growth[2]. This inconsistent link between entry density and growth is not

[1] Good examples of such measure of entrepreneurship are the Global Entrepreneurship Monitor's (GEM) Total Early-stage Entrepreneurial Activity (TEA) Index, the World Banks' new business registration data, the self-employment ratio and the private employment ratio.

[2] Some scholars find a positive correlation between entry density and economic growth (McMillan and Woodruff, 2002, Acs et al., 2012 and Audretsch and Keilbach, 2004); conversely, others suggest that the entry density—growth nexus is non-existent (van Stel, Carree and Thurik, 2005, Wong, Ho, and Autio, 2005 and Naude, 2011). Moreover, even the micro-economic literature on the nexus between firm age and firm

surprising because entry density itself is a weak proxy of Schumpeterian entrepreneurship[3]. Fortunately, Mthanti and Ojah (2017) address the need for an improved macro-level proxy of Schumpeterian entrepreneurship and devised a measure, i.e., aggregate-level entrepreneurial orientation (EO), which is more in line with Schumpeter's (1912) conception of what entrepreneurial firms do: i.e., co-opting, creating, diffusing and exploiting new production knowledge.

Macro-level EO, characterised as firms' "enhancing innovative capabilities; investing in risky, unique and uncertain sectors; and proactively seeking new markets and advanced technology"; may be important to countries' learning through both imitation and experimentation (Mthanti and Ojah, 2017). Empirically, lofty EO[4] behaviour amongst firms seems a more plausible channel, than entry density, through which institutions and human capital facilitate growth because it (EO): (1) is positively associated with knowledge diffusion; (2) correlates positively with high levels of income, (3) correlates positively with economic growth, and (4) it subsumes the impact of institutions and human capital on growth (Mthanti and Ojah, 2017), as Schumpeter had theorised.

Furthermore, if institutions and human capital indeed, partially, foster economic growth through enhancing entrepreneurship, then appropriate proxies of Schumpeterian entrepreneurship should positively correlate with institutions and human capital. Additional support for lofty EO behaviour amongst firms as a more plausible channel than entry density, through which institutions and policies facilitate growth, is provided in Figure 1. As can be seen in the figure, EO closely tracks time-varying institutional and human capital variables. On the other hand, there seems to be little association between proxies of entry density (GEM's Total Early-stage Entrepreneurial Activity [TEA] and the World Banks' new business registration data) and, institutional and human capital variables. These divergent relations are further corroborated by the correlation matrix in Table 1: EO is a robust correlate of human capital and institutional variables; while, conversely, entry density proxies are either not as robust or are negatively related to human capital and institutional variables.

Insert Figure 1

Insert Table 1

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productivity shows that: (1) productivity increases with firm age, and (2) new firms die young (Shane, 2008). Based on these macro- and micro-level findings, it is self-evident that the hypothesized channel (if represented as entry density) through which institutions and human capital are deemed to facilitate growth may itself not be a consistent correlate of growth.

[3] In the Schumpeterian model, entrepreneurs engage in innovation, risk-taking and business activities that lead to knowledge spill-over, new combinations and technological progress (Audretsch and Feldman, 1996); thus, facilitating economic growth. However, entry density indicators correlate negatively with measures of innovation, risk-taking and knowledge diffusion (Henrekson and Sanandaji, 2013), which Schumpeterian entrepreneurship is meant to engender. Based on the foregoing, it follows that small business activity is an inadequate measure of aggregate level Schumpeterian entrepreneurship.

[4] Note that we use the terms Schumpeterian entrepreneurship, Macro-level EO and lofty EO interchangeably because we consider them all to reflect Schumpeterian entrepreneurship.

Therefore, based on a comprehensive review of the literature and preliminary correlational and trend analyses, which suggest lofty EO behaviour amongst firms might be (1) a more appropriate proxy of Schumpeterian entrepreneurship and consequently (2) a more plausible channel through which institutions and human capital shape growth, it follows that understanding the possible correlates (or more intuitively, antecedents) of EO is vital for clarifying the institutions— and/or human capital—growth nexus[5]. However, EO has hitherto been researched mainly as purely a firm-level phenomenon. And although firm-level antecedents of firm-level EO such as firm size, technology, the personality of the founder/CEO and environmental hostility have been identified (Rauch et al., 2009); the empirical macro-level literature gives us little guidance on the association between aggregate level EO and its potential drivers[6].

For instance, for us, it is not self-evident that different personality types of founders/CEOs would explain cross-country variations in macro-level EO. So, there seems to be a clear research gap which is a significant omission particularly since entrepreneurial processes (such as macro-level EO), as Schumpeterian theory submits, are expected to manifest differently across: (1) different institutional and policy set-ups, and (2) different levels of income (development)[7]. In this paper, we address this gap and build on Mthanti and Ojah's (2017) work; recasting human capital and institutional variables as correlates/antecedents of macro-level EO, instead of growth, as is traditionally done in the growth literature.

However, the characterization of Schumpeterian entrepreneurship as entry density creates an awkward difficulty in identifying potential determinants of EO since what are in the literature considered drivers of entrepreneurship may merely be determinants of entry density[8]. This attribution is problematic because the empirical evidence suggests that entry density correlates negatively with measures of productivity, innovation and knowledge diffusion, as well as EO itself[9]. All the same, the literature suggests that there are instances, particularly in countries transitioning from communism (planned economic system) to a market driven economic system, where entry density may embody

[5] This clarification is important because the said nexus may largely be shaped by Schumpeterian entrepreneurship.

[6] EO has hitherto been researched mainly as a firm-level phenomenon. And although firm-level antecedents of firm-level EO such as firm size, technology and environmental hostility have been identified (Rauch et al., 2009); the association between macro-level EO and its potential drivers has yet to be researched.

[7] In fact, Lee and Kim (2009) argue that there are two stages of development. The first one involves the transition from low-to-middle income, and that Schumpeterian entrepreneurship in this stage might be facilitated by improving institutions and primary/secondary education. The second stage involves transitioning from middle-to-high income and technological upgrading, where growth in this stage involves improving mainly policy variables and tertiary education.

[8] For example, culture (Hofstede, 2010), the protestant work ethic (Weber, 2002), self-efficacy (Markman et al., 2002), etc., which are linked to entry density, would also, erroneously, be assumed antecedents of entrepreneurship.

[9] The TEA and new business density correlate negatively or insignificantly, with entrepreneurial orientation, with a Pearson correlation coefficient of -0.38 ($p<0.01$) and 0.09 ($p<0.10$), respectively.

Schumpeterian entrepreneurship, and as a consequence correlates positively with productivity and knowledge diffusion, both of which Schumpeterian entrepreneurship engenders[10]. In these ex-communist economies, new firms are the main drivers of structural transformation and reform (Johnson et al., 1999, McMillan and Woodruff, 2002, Audretsch and Keilbach, 2004 and Berkowitz and Dejong, 2005) because existing large firms are usually rigid former planning institutions that must be transformed before they can begin to embrace lofty EO behaviour (Estrin et al., 2006).

By deduction, the correlates of entry density in transition economies may very well be potential correlates of risk-taking, innovativeness and proactiveness, generally, since they engender growth by facilitating Schumpeterian entrepreneurship[11]. In fact, the growth literature on transition economies finds that the effectiveness of facilitating technology diffusion and growth is shaped particularly by: (1) human capital (Berkowitz and Dejong, 2005 and Aidis and Sauka, 2005), (2) the availability of finance (e.g., banking development) (Johnson et al., 1999 and Pissarides 2004), (3) the control of corruption (Johnson et al., 1999; and Djankov et al., 2005) and (4) inequality (Glaeser et al., 2003). The broader macro-analysis literature has, however, mainly investigated these institutional variables (banking development, corruption, and inequality), and human capital, as direct determinants of economic growth (King and Levine, 1993, Barro, 2000, Acemoglu et al. 2001 and Glaeser et al. 2004); and not, necessarily, as enablers of Schumpeterian entrepreneurship.

Therefore, we more specifically address this omission by investigating whether banking development, corruption, and inequality, and human capital that have been hereto identified as critical drivers of knowledge diffusion in transition economies; also, partially, explain more broadly the cross-country variation in Schumpeterian entrepreneurship (macro-level EO). We ask: (a) do institutions or human capital enhance/correlate positively with Schumpeterian entrepreneurship (EO)? And (b) does the impact of institutions and human capital on EO vary with the level of economic development? That is, are the hitherto said determinants of growth (e.g., quality institutions and good policies) positive correlates of the hypothesized channel of growth, Schumpeterian entrepreneurship, across all levels of development? And what is the true place of these correlates in the economic

[10] Berkowitz and Dejong (2005) suggest that entrepreneurs in former socialist countries have enhanced productivity in construction, trade, commerce, small-scale manufacturing and services.

[11] Therefore, for institutional variables, we relied on banking development, inequality and corruption instead of Polity IV Project (Jaggers and Marshall's, 2000); International Country Risk Guide (ICRG) (Acemoglu et al., 2001); etc. In particular, the control of corruption and inequality are appropriate proxies of institutions because, firstly, unlike governance measures, they are more likely to have a direct association with EO (Asiedu and Villamil, 2000; and Wei, 2000). For example, innovation, risk taking and proactiveness can take place in an autocracy, such as China or a democracy, such as Sweden. However, corruption in either of these countries would alter the calculus of entrepreneurial firms. They would have to decide whether to use valuable resources on rent seeking and bribery or on innovation and risk taking. Similarly, inequality occasioned by arbitrary discrimination alters the opportunity set faced by talented individuals from minority groups. Exclusion from educational opportunities and business leadership reduces both the human and entrepreneurial capital stock, with possibly dire consequences for lofty EO behaviour amongst firms.

growth calculus in (1) low income countries that are transitioning to middle income and (2) in middle income countries that are transitioning to high income? The clarification of this overarching question would, no doubt, better inform a more effective framing of growth policy or sequencing/prioritizing of growth antecedents.

Our results show that the human capital—EO nexus is robust across diverse levels of development. However, the institutions—EO nexus seems conditional on the level of economic development (income). In line with theoretical predictions, institutions indeed drive EO in middle-to-high income countries; but in low income countries, institution building that seeks to foster EO may yield perverse outcomes. Importantly, the institutions— and policies—EO associations, which virtually replicate the institutions— and policies—growth relationships, coupled with EO explaining a large degree of unique variance in growth, even at low levels of productive capabilities, support the notion that EO is indeed an important conduit through which institutions and policies engender growth. By implication, therefore, although improving the quality of institutions is critical for EO and growth in middle-to-high income countries; it may not be a necessary precondition for EO and growth in low income countries; especially since: (1) EO may very well lead institutional development in low income countries and (2) EO is a highly persistent series with self-reinforcing network effects; in other words, lofty EO behaviour encourages more lofty EO behaviour.

Our work is closely related to the emerging literature that seeks to explain why entrepreneurial and innovative activities differ systematically across countries due to cross-country variations in institutions and policies (Autio et al., 2014, Acs et al., 2017 and Lehmann and Seitz, 2017). In this literature, the National Systems of Entrepreneurship (NSE) framework clarifies how differing national policies, and formal and informal institutions, shape cross-country variation in individual entrepreneurial endeavour (Acs et al., 2014); and the National Systems of Innovation (NSI) (Nelson, 1993) explains the effect of national institutions and policies on cross-country variation in R&D and innovation. We add to this literature by clarifying the impact of national institutions and policies on cross-country variation in what entrepreneurial firms actually do: that is, innovate, take risks and proactively acquire both new technology and markets (i.e., EO). Importantly, we do not (erroneously in our view) use firm age, or for that matter invention alone, as a cross-country proxy of Schumpeterian entrepreneurship[12].

[12] In our view, both the NSI and the NSE frameworks present rooms for improvement: (1) the NSI framework implicitly assumes firm age/size is an appropriate proxy for knowledge diffusion and (2) the NSE framework assumes diffusing new production knowledge equates to invention. However, Schumpeter (1912) cautioned that, as long as entrepreneurial firms do not assume risks and proactively diffuse production knowledge, inventions maybe economically irrelevant. And it follows that merely counting the number of new firms and/or the number of self-employed individuals or group of individuals will tell us very little about innovation, risk-taking and proactiveness and, consequently, tell us little or nothing about economic growth.

So, overall, the main unique contributions of our paper are: (i) explicating the potential macro-level correlates/drivers of macro-level EO, which may be quite distinct from antecedents (or correlates) of firm-level EO (e.g., firm age); and (ii) positioning more productively the role of Schumpeterian entrepreneurship vis-à-vis other linked correlates of growth in the calculus of economic growth at varying levels of development. This better placement or sequencing of growth antecedents, whilst accounting for context, would, no doubt, improve future growth strategies/policies[13]. To this end, we directly link human capital and institutional variables to the channel through which they are hypothesized to enhance growth – i.e., Schumpeterian entrepreneurship. Additionally, we further buttress the development of EO as an improved aggregate level construct (proxy) by clarifying: (1) the human capital—EO nexus and (2) the institutions—EO nexus, across different levels of economic development.

For the remainder of the paper, Section 2 explores the literature that underpins potential antecedents of Schumpeterian entrepreneurship (EO), alongside hypotheses of their expected relations to EO. Section 3 discusses the research design and the estimation techniques used in the analyses conducted. Section 4 presents and discusses the documented results. Section 5 contains further discussion of results, with concluding remarks that highlight key policy derivatives of our findings.

2. The determinants of EO

2.1 Corruption

The corruption—growth relation has been investigated extensively; however, the literature has not definitively resolved whether corruption hinders or facilitates economic development. There are basically two main theories: sanding the wheels and greasing the wheels hypotheses. The sanding the wheels hypothesis views corruption as an impediment to development, entrepreneurship and growth since in corrupt countries the rewards to entrepreneurial endeavour may not accrue to the risk taker (Méon and Sekkat, 2005), which in turn may hinder productivity and growth (Lambsdorff, 2003).

This point of view, hitherto, has some empirical support (Mauro, 1995). Cross-country regressions suggest that the operating channels through which corruption may influence growth are: reduced foreign direct investment (Wei, 2000), entrepreneurship (Johnson et al., 1999; and Djankov et al., 2005) and openness (Pellegrini and Gerlagh, 2004). And Mo (2001) suggests that this association is economically important — a 1% increase in corruption reduces the growth rate by about 0.72%.

[13] For instance, there is likely to exist resource demand (and thus cost) differential between provisioning the "encompassing" Schumpeterian entrepreneurship (EO), and provisioning a single or a couple of institutions and/or human capital variables that are ascertained to empirically relate to economic growth. Further, besides the cost differential, the questions of which of these two groups of antecedents have more economic and sustainable effects on growth, and at what level of a country's development either of these groups of antecedents elicit incremental growth, remain so important that they should also inform a more effective growth strategy.

However, Ehrlich and Lui (1999), supporting the greasing the wheels hypothesis[14], question the positive relationship between reduced corruption and growth in developing countries. They contend that higher corruption does not necessarily have a negative impact on economic growth. Instead, corruption may positively mediate the relation between growth and bureaucratic inefficiency such that, in developing countries with inefficient administration, corruption may facilitate entrepreneurship and economic activity (Aidt, Dutta and Sena, 2008 and Méon and Weill, 2010).

Olken (2005) suggests that the inconsistent corruption—growth link may not merely be due to poor institutions in developing countries; instead, it may be due to measurement error — i.e., the majority of empirical studies do not measure objective corruption; rather, they calibrate people's subjective perceptions of corruption. He, therefore, cautions against using perception-based indicators to measure corruption in countries that are not socially cohesive, as this may lead to results that do not reflect effects of objective corruption[15].

In sum, this literature suggests that corruption facilitates growth through the productivity channel by increasing the private appropriation of returns to Schumpeterian entrepreneurship/EO (Knack and Keefer, 1995). It follows that reduced levels of corruption and arbitrary discrimination would support EO. However, in developing countries, due to bureaucratic inefficiency and arbitrary discrimination, higher levels of corruption may, counterintuitively, facilitate EO. Therefore, the hypothesised positive association between the control of corruption and EO may be conditional on: (1) social trust and (2) on the level of development.

2.2 Banking (financial) market development

Theoretically, financial institutions are important because they evaluate and finance entrepreneurs' innovation and launching of new products to market (Schumpeter, 1912), as well as ease the pooling, trading and hedging of risk which encourages investment in projects with high risk and corresponding high expected returns (Devereux and Smith, 1994 and Obstfeld, 1995). Empirically, financial depth[16] facilitates the diffusion of new productive knowledge (Gemünden et al., 1992) and, as a result, accelerates economic growth through a large positive effect on total factor productivity; however, the association with physical capital, private savings rates and labour are questionable (Beck et al., 2000). Essentially, better financial intermediaries enhance the chances of

[14] This hypothesis posits that corruption may help bypass poor governance, thereby smoothing investment and Schumpeterian entrepreneurship, and consequently, growth (Huntington, 2006).
[15] However, they may reflect results based on perceptions since people act based on their perceptions. And therefore, although the objective corruption—growth nexus may not be robust, the perceived corruption—growth negative association might hold.
[16] Measured by credit to the private sector as a share of GDP; the rationale is that private credit is more likely, than public credit, to accurately reflect the financial intermediation and investable funds allocative roles that the banking sector play.

successful innovation and knowledge diffusion (King and Levine, 1993, Jayaratne and Strahan, 1996). Consequently, countries with high levels of financial development, and effective institutions, are better able to support the growth of innovative industries that are largely reliant on external finance (Rajan and Zingales, 1998 and Beck et al., 2008). On the other hand, financial development does not have a positive impact on growth in countries with weak institutions (Demetriades and Hook Law, 2006), double digit inflation (Rousseau and Wachtel, 2002 and Yilmazkuday, 2011) and small financial sectors (Deidda and Fattouh, 2002).

Developing countries with low levels of financial development are thus unable to support infant industries since their firms are credit and equity rationed (Ayyagari et al., 2008). And these financial sector distortions can reduce the rate of innovation and inhibit Schumpeterian entrepreneurship/EO (King and Levine, 1993). From this likely relationships, it follows that banking development may hinder economic growth in developing countries (Zhang, 2003 and Shen and Lee 2006). Levine (2002) suggests that these counterintuitive results could be because: (1) banks with market power may extract a greater share of future profits from firms than they should; (2) banks are conservative and thus a large banking sector relative to GDP may hinder firm innovation and growth; and (3) in firms with poor cooperate governance, banks may connive with corrupt managers if these managers do not serve the firms' interests (Black and Moersch 1998). In other words, where corruption is high and the courts are ineffective, banking development might be irrelevant to Schumpeterian entrepreneurship/EO (Johnson et al., 1999).

Our synthesis of the financial development literature suggests that banking development would support EO by: (1) evaluating and financing Schumpeterian entrepreneurs' innovation and proactive knowledge diffusion; and (2) easing the trading, pooling, hedging and diversification costs of entrepreneurial innovation and risk taking. However, this positive association with EO may be conditional on: (i) the control of corruption and inequality, and (ii) level of economic development.

2.3 Human capital

Glaeser et al. (2004) highlights the importance of human capital accumulation for economic development. Human capital is deemed to facilitate growth by enhancing the ability of a country to imitate and learn advanced technologies that originate from within, and offshore (Stokke, 2008); increasing the absorption of spill-overs from FDI (Borensztein et al., 1998); and significantly increasing entry by knowledge-based Schumpeterian firms (Baptista and Mendonça, 2010), which, through EO, generates a higher rate of total factor productivity growth. This argument, which views an educated workforce as a critical prerequisite for Schumpeterian entrepreneurship and growth, has found mixed empirical support. Larroulet and Couyoumdjian (2009) find that a high stock of human

capital enhances economic growth, as was supported by Glaeser et al. (2004) who record that schooling enables total factor productivity growth (Benhabib and Spiegel, 1994).

However, some empirical growth studies find an insignificant or negative association between schooling and economic growth. For instance, Benhabib and Spiegel (1994) and Pritchett (2001) show that educational attainment does not explain the growth rate of output per worker. To explain these seemingly contradictory findings on the human capital—growth nexus, literature posits that these inconsistent findings may be due to data and methodological differences (Bils and Klenow, 2000 and Cohen and Soto, 2007). Furthermore, there might be economic reasons for these conflicting results — corruption, black market premium and brain drain may render human capital unproductive (Rogers, 2008). Thus, the positive impact of human capital on Schumpeterian entrepreneurship, productivity and growth may not manifest in an economy until such time that it reaches a certain threshold level of development (Ahsana and Haque, 2015). However, Coco and Lagravinese (2014) argue that even developed countries may not enhance entrepreneurship and productivity through schooling since cronyism, and corruption, may reduce the motivation to develop cognitive skills.

In sum, the literature suggests that a workforce that is good at learning, creating, and implementing new production knowledge may support productivity enhancing EO. However, this positive association between schooling and EO might be more likely when: (1) corruption and cronyism are low and (2) the level of development is relatively high.

2.4 Inequality

The proactive actions necessary to attack new markets and appropriate technology require purposeful cohesive action that is more likely in relatively more equal societies with agreed upon long-term objectives than in both less equal and less cohesive societies. Moreover, in many unequal societies the existence of unproductive, rent-seeking, parasitic elites may frustrate entrepreneurship (Baumol et al., 2007), and growth promoting activities. For this reason, the accumulation of capital and the production of knowledge in unequal countries are likely to be constrained (Persson and Tabellini, 1991), and consequently reduce economic growth (Alesina and Rodrik, 1994 and Baumol et al.'s 2007).

However, this hypothesised negative association between inequality, Schumpeterian entrepreneurship and growth may not be robust. For instance, Forbes (2000) finds a positive relationship between inequality and growth. Barro (2000) suggests that the impact of inequality on growth depends on the level of development — inequality lowers growth only in poor countries, whereas it promotes growth in developed countries. Shin (2012) explains Barro's (2000) findings by suggesting that in developed countries the rich save more than the poor, thus enabling the capital

accumulation necessary for growth. On the other hand, in volatile and poor countries, income inequality may lead to redistributive political and social policies that lead to a decline in Schumpeterian entrepreneurial endeavour.

In a similar vein but on a different note, Glaeser et al. (2003) suggest that the impact of inequality on growth may not be direct; but rather indirect — through its negative impact on institutions. Inequality in economies with weak institutions may allow the rich to subvert legal, political and regulatory institutions, which are critical for protecting Schumpeterian entrepreneurs' property rights; thus, resulting in sub-optimal economic outcomes (Knack and Keefer, 1995). In sum, the literature suggests that inequality, entrepreneurship and growth relation may not be determinate. Inequality may facilitate the accumulation of funds necessary for risk taking and thus supporting EO; on the other hand, income inequality may also lead to redistributive policies that threaten the property rights of Schumpeterian entrepreneurs, leading to a decline in EO. However, and despite the indeterminate inequality—growth relation, inequality still might be an important intervening variable that shapes the institutions—EO relationship.

3. Research Design

In order to clarify the aggregate level association between EO and its potential drivers, we use secondary, longitudinal, panel data that contains both cross-sectional and time series elements. The dataset is constructed from the Castellacci and Natera (2011) (CANA) panel database and the World Development Indicators (WDI). Our sampling frame is the 134 nation states that have been in existence for more than 10 years and are represented in both the CANA and the World Bank's WDI databases. The complete useable sample covers data on 93 countries over the period 1980-2008.

3.1 Independent variables

Our independent variables are the variables: banking development, control of corruption and inequality (representing institutions), and human capital. First, following Čihák et al. (2012), we adopt the private credit to GDP ratio in order to operationalise banking development. To calibrate economic well-being gulfs in nation states, we employ the Gini coefficient (Rodrik, 1999). Next, to calibrate corruption, we follow Olken and Pande (2011) and employ the Corruption Perception Index from Transparency International, which ranges from 0 (indicating high corruption) to 10 (indicating low corruption). We term this indicator the control of corruption in order to simplify analysis. The variables employed in creating this indicator include: the frequency of bribes, the size of bribes and political corruption by national leaders (Anokhin and Schulze, 2009).

Importantly, we use the control of corruption and inequality as proxies of institutions mainly because unlike governance measures they have a direct association with EO (Asiedu and Villamil,

2000 and Wei, 2000). For example, innovation, risk taking and proactiveness can take place in an autocracy such as China or a democracy, such as Sweden. However, corruption in either of these countries would alter the calculus of entrepreneurial firms. Firms would have to decide whether to use valuable resources on rent-seeking and bribery or, more productively, on innovation and risk taking. The same holds for inequality. Banking (financial) development can be said to embody legal/regulatory effectiveness that particularly foster appropriate contracting and recourse guarantees, which naturally enable financing of entrepreneurial activity (La Porta et al., 1997; and Beck and Levine, 2004)

Lastly, and analogous to Lee and Kim (2009), we operationalise the level of human capital by using both the secondary and tertiary education enrolment ratios. Lee and Kim (2009) suggest that tertiary and secondary educations have a divergent impact on EO, depending on the level of economic development; therefore, we investigate both these indicators as determinants of EO.

3. 2 Dependent variable

Mthanti and Ojah (2017) employ exploratory factor and correlation analysis to confirm both the dimensionality and validity of the sub-constructs of EO as well as of EO itself (Hair et al., 2010). Innovativeness is validated as a composite of innovative input, scientific output and technological output using investments in R&D, the number of scientific and technical journal articles published per million people and US patents granted per country of origin as indicators, respectively. Proactiveness is established as a construct that best reflects the activities of search and discovery at the international level; implying that firms in a pro-active country (e.g., Singapore) will seek out new and/or productive technology, export and internationalising opportunities more than firms in countries that are insular, such as Iran.

Mthanti and Ojah (2017) follow Pietrobelli's (1996) theorising and adopts FDI, the export/GDP ratio, internet users per 1000 people and royalty and license fees payments as measures of proactiveness. Risk taking is empirically confirmed as capital accumulation in highly uncertain sectors using three indicators: Adjusted (reverse scored) agricultural value-added[17], the domestic savings rate and gross investment. Adjusted agricultural value-added reflects the propensity to diversify and invest in risky sectors, the domestic savings rate reflects the ability to do so over time and gross investment is an imperfect measure of the magnitude of investment. Hence, we use all three variables to operationalise risk taking.

[17] The agriculture sector includes forestry, hunting and fishing, cultivation of crops and livestock production. Summing up the sector's output and subtracting intermediate inputs yield "agriculture value-added". It is therefore clear to see that reverse-scoring this value-added reflects a country's extent of participation in newer and more uncertain production sectors than in the more familiar, if not certain, agriculture sector – i.e., the reverse-scoring of agriculture sector's production technology reflects risk-taking.

With the sub-constructs of EO defined and validated, Mthanti (2017) proceeds to confirm EO at the aggregate level as a reflective, unidimensional, second-order latent construct with three indicators that covary: risk taking, innovativeness and proactiveness. These three variables load significantly on the same factor, and construct validity is established by showing that EO has a higher correlation with high technology exports than high technology exports has with any of EO's sub-constructs.

3.3 Descriptive statistics

Table 1 displays the mean, standard deviation and rank of EO for a set of purposefully selected countries between 1980 and 2008. The means of the hypothesized determinants of EO are also displayed. The top 10 EO countries are all high income countries, with Singapore achieving the highest average EO score over 29 years; and they all score highly on the control of corruption, banking (financial) development and tertiary education. However, Singapore scores quite low on inequality with a Gini Index of 46.02, which is substantially above the sample average of 37.56.

Former Soviet Bloc countries, the Czech Republic and Slovenia rank highly on EO, equality and tertiary education enrolment indicators, exceeding some developed countries; for instance, the United Kingdom. Likewise, China scores highly on EO at number 31, realising a higher grade than both Portugal and Russia. However, China's performance on the determinants of EO is mixed. It ranks very poorly on corruption and tertiary education, achieving scores well below the sample average, whereas it attains a high score on equality and access to credit by the private sector.

Insert Table 2

On the other hand, African countries attain very low scores on EO and its determinants, with Lesotho and Ethiopia ranking last and second last, respectively. South Africa is ranked in the middle, number 52 out of 93 countries. The country seems to have a similar profile to Latin American countries such as Chile, Brazil, Argentina and Uruguay. They all attain average EO scores of around zero, have high inequality, well-developed financial systems and are moderately corrupt. However, whereas the Latin American group tends to score highly on tertiary education enrolment, South Africa performs poorly on this measure. Figures 1 to 3 illustrate tertiary education, domestic credit and EO trends, respectively in selected countries. The figures show that countries that have high human capital as well as developed banking systems seem to attain a high EO.

Insert Figure 2

Insert Figure 3

Insert Table 3

Table 3 presents the correlations between EO, its sub-constructs – innovativeness, risk-taking and proactiveness and its hypothesized determinants – control of corruption, inequality, domestic credit and the human capital variables. EO is significantly and positively ($p<0.00$) correlated to the control of corruption, domestic credit, tertiary and secondary education enrolments; and as expected, it is negatively related to the Gini index. Similarly, the sub-constructs of EO, innovativeness, risk-taking and proactiveness, are positively ($p<0.00$) correlated to the control of corruption, domestic credit, tertiary and secondary education enrolments, whereas they are also negatively related to the Gini index. Interestingly, EO has a higher association with both human capital variables than its sub-constructs; this outcome further enhances the reliability and nomological validity of this variable.

Insert Table 3

3.4 Estimation methodology

We begin by evaluating whether corruption, inequality, banking development and human capital are positively related to EO. EO is composed of several persistent series such as R&D and FDI; therefore, lagged EO is likely to be associated with current EO. In addition, entrepreneurship and institutional variables may be possibly endogenous because of omitted variables and reverse causality (Li et al., 2012). For example, banking development might be occasioned by financial institutions with a high EO, using innovative methods to increase credit availability to the private sector. Likewise, countries with a high EO might attain a higher stock of human capital — e.g., a high EO may increase demand and, as a result, increase wages for knowledge workers in innovative sectors.

Workers may in turn respond to these increased returns to education by staying longer in school. Hasan and Tucci (2010) suggest that such endogeneity can be reasonably ameliorated by the Generalized Method of Moments (GMM) procedure for panel estimation. Roodman (2009) suggests that system-GMM with a linear functional relationship, an autoregressive dependent variable, fixed country effects, heteroskedasticity and autocorrelation are appropriate for our kind of dataset. We therefore adopt the system-GMM estimators to analyse our data. The equation takes the following form:

$$EO_{it} = \alpha_0 + \alpha_1 EO_{it-1} + \alpha_2 Corru_{it} + \alpha_3 FinDev_{it} + \alpha_4 SoCo_{it} + \alpha_5 HumanCap_{it} + \alpha_6 \theta_i + \alpha_7 Z_t + \varepsilon_{it}, \quad (1)$$

where EO_{it} is entrepreneurial orientation in country i at time t, the lag EO_{it-1} represents the expected persistence of EO as we would expect it to manifest over time and takes into account serial

correlation, $CORRU_{it}$ represent our measure of corruption, $FINDEV_{it}$ measures financial development, $SOCO_{it}$ calibrates social cohesion and $HUMANCAP_{it}$ represents human capital. In addition, θ_i is the measure of time-invariant country fixed effects, Z_t is the vector for time dummies and ε_{it} represents the random error term.

3.4.1 Reliability and validity

Blundell and Bond (1998) suggest that, in system-GMM, instrument validity can be ascertained by employing the Sargan test of over-identifying restrictions and autoregressive (AR) test which examines serial correlation in the error terms in both the difference regression and the lagged difference-level regression. The differenced error term is permitted to be to be AR (1). However, AR (2) serial correlation in the differenced error term contravenes the assumption of the GMM technique. Therefore, following Hasan and Tucci (2010), if the p-values of the AR (2) test and the Sargan test are not significant (>0.05), we will not reject the null hypotheses of over-identification and no second order autocorrelation of error terms.

Although the Sargan test and the AR (2) test are helpful in determining the validity of instruments, Roodman (2009) submits that in dynamic GMM, a high instrument rank can lead to endogenous variables being over-fit and the power of the Sargan test being reduced. To ensure instrument validity, the ratio of the number of cross sections (n) to the instrument rank (r) should be greater than 1, since an r < 1 increases the chances of the regression yielding spurious results. Following Asiedu and Lien (2011), we report the instrument count and r for all our regressions and where r < 1, we reduce the instrument rank by restricting the number of lags of the dependent variable that can be used as instruments.

4. Estimation Results

4.1 System-GMM results

Table 4 reports the correlation matrix of the independent (and control) variables. The pairwise correlation coefficients show that multicollinearity may be a problem between the human capital variables (0.78); and between wealth (log of GDP) and the control of corruption (0.82) as well. We take cognizance of these in our estimations.

Insert Table 4

Table 5 reports results of the system-GMM regressions for the whole sample. The log of GDP per capita in 2005 US dollars is included as a basic control variable, and EO is the dependent variable. The Sargan and AR (2) tests are satisfactory and, furthermore, r > 1 in all the regressions; thus,

suggesting that the Sargan test has sufficient power and the instruments are valid. The estimated coefficient of lagged EO is positive and significant ($p<0.01$) across all models, justifying our decision to use the system-GMM estimator. The control variable, log of GDP, also carries a positive sign which is significant across all models. Model (1), in Table 5, suggests that the control of corruption (the only independent variable included) is negatively related to EO ($p<0.01$).

However, when we control for inequality in Model (5), the coefficient of the control of corruption changes sign and becomes positive ($p<0.01$). This positive association between EO and the control of corruption, contingent on inequality, is both in line with literature (see section 2) and robust to the inclusion of domestic credit, tertiary and secondary education as independent variables. These results seemingly provide support for the assertions that: (1) perceptions of corruption may be influenced by social trust (Olken, 2005); and (2) inequality might be an important intervening variable that shapes institutions (Glaeser et al., 2003).

Insert Table 5

Model (2) indicates a negative relationship between domestic credit to the private sector and EO ($p<0.05$). However, when we control for reduced corruption and inequality in model (7), the sign of the coefficient of domestic credit changes from negative to positive ($p<0.01$). This outcome is robust to controlling for human capital and wealth, and aligns with King and Levine's (1993) assertion that better financial intermediaries enhance the chances of successful innovation and knowledge diffusion; and that this result is however, and in line with expectation from literature (section 2), conditional on effective institutions that reduce corruption and inequality (Demetriades and Law, 2006).

Next, we evaluate the relation between human capital variables and EO (model 3). The tertiary education variable is negatively associated with EO ($p<0.01$), whereas on the other hand, secondary education is positively related to EO; and this association is robust to the inclusion of domestic credit, inequality and wealth as predictors (model 9). From these results we can infer that (1) schooling is a robust predictor of EO, supporting Glaeser et al.'s (2004) assertion that human capital accumulation enables total factor productivity growth; (2) secondary education is a more robust predictor of EO than tertiary education; and (3) significantly, inequality and corruption do not seem to negatively affect the EO—human capital association.

In model (4) we investigate the relation between inequality and EO, which we find to be negative ($p<0.01$). However, when we include the control of corruption and banking development in model (8), the relation becomes positive and significant ($p<0.01$). This result is robust to the inclusion of the human capital variables in model (9) as well as wealth in model (10); this set of outcomes seemingly suggests that as much as inequality may shape the institutions—EO relation (Glaeser et al.,

2003), reduced corruption and a well-developed banking system may also ameliorate the negative impact of inequality on EO.

4.2 Results by income (development) levels

The results of the whole sample may provide incomplete insight into the examined relations since (1) Schumpeterian growth theory postulates that policies and institutions may affect EO differently according to income (development) levels (Lee and Kim, 2009) and (2) our review of literature strongly suggests that besides institutional quality, the impact of human capital, banking development and corruptions on EO might also be conditional on the level of development. In fact, Lee and Kim (2009) argue that that there are two stages of development—the first one involves the transition from low-to-middle income and Schumpeterian entrepreneurship in this stage might be facilitated by improving institutions. The second stage involves transitioning from middle-to-high income and technological upgrading and growth in this stage involves improving mainly policy variables. So, we pay heed to context, follow Lee and Kim (2009), and categorise countries whose GDP per capita in 2000 is higher than US $3000 as middle-to-high income countries, whereas countries whose GDP is lower than US $3000 are classified as low income countries.

Tables 6 and 8 present the correlation matrices of the independent and control variables for middle-to-high income countries and low income countries, respectively. Once again, the association between the human capital variables (0.70), and wealth and the control of corruption (0.75), may indicate potential problems with multicollinearity in middle-to-high income countries. On the other hand, in low income countries the correlations between all the independent variables, except for human capital indicators (0.82), are largely in single digits.

Insert Table 6

Insert Table 8

Tables 7 and 9 present the results of the system-GMM regressions of EO determination for middle-to-high income countries and low income samples, respectively. We drop the log of GDP per capita in 2005 US dollars as a control variable since we have divided the sample into two subsamples, based on income (development) levels. However, we use wealth as a robustness measure in models 10 (Table 7) and 11 (Table9). EO remains the sole dependent variable. The Sargan and AR (2) tests in all system-GMM regressions are not significant ($p > 0.05$); therefore, we cannot reject the null hypotheses of over-identification and no second order autocorrelation of error terms. The estimated coefficient of lagged EO is positive ($p < 0.01$). Furthermore, $r \geq 1$ in all the regressions, and again suggesting that the Sargan test has sufficient power.

Insert Table 7

Insert Table 9

First, the control of corruption has a robust and consistent association with EO in middle-to-high income countries, whereas in low income countries we find a fairly persistent negative relationship between low corruption and EO. These results, which are robust to controlling for corruption and inequality, suggest that in middle-to-high income countries the control of corruption plays its expected role — it fosters EO by ensuring that the rewards of entrepreneurial endeavor accrue to the risk taker. On the other hand, in developing countries the protection of property rights is a responsibility of inefficient bureaucracies which may, intentionally, discriminate on the basis of race and/or ethnicity, ala South Africa, Kenya, Brazil and India, to name a few. And corruption in such instances may very well ameliorate the perverse effects arbitrary discrimination has on Schumpeterian entrepreneurship (Ehrlich and Lui, 1999 and Aidt et al.'s 2008) and, therefore, support EO.

Second, the banking development—EO positive association holds in middle-to-high income countries, in line with Levine's (2005) finding that banking development supports entrepreneurship. Thus, Levine's (2005) thesis seems to be contingent on the level of development. In low income countries, banking development hinders EO, which partly supports Khan and Senhadji (2003), Zhang (2003), and Shen and Lee's (2006) contention that banking hinders the development of productive capabilities especially in Latin American, Sub-Saharan African and East Asian countries[18]. A plausible explanation for this finding is that in low income countries, with weak institutions, credit may be allocated corruptly to people of the same ethnic group, leading to resources being wasted in inefficient projects. Further, large banks with market power may extract rents and a greater share of future profits from firms than they should (Levine, 2002). Moreover, in firms with poor corporate governance (which are prevalent in developing countries; Ojah and Godspower-Akpomiemie, 2017), banks may connive with inefficient managers if these managers serve their interests (Black and Moersch, 1998); thus, frustrating EO in the process.

Third, the relationship between inequality and EO seems to be negative in both low and middle-to-high income countries. However, this result is not robust; in the aggregated sample, the association is positive. Literature has also found contradictory results between income inequality and the outcomes of entrepreneurship: Forbes (2000), Aghion and Howitt (2002), and Okun (1975) find a positive association whereas Persson and Tabellini (1994), Acemoglu (1998) and Sukiassyan (2007) find a negative relation. Amos (1988), Barro (2000), and Banerjee and Duflo (2003) suggest the relation is inconclusive. A possible reason for these seemingly contradictory findings is that inequality

[18] These findings are robust to controlling for corruption and inequality.

partially shapes the relation between institutions and human capital (Naude, 2011, Glaeser et al., 2003), and EO. Easterly (2006) posits that this emanates from the fact that the causal direction runs from inequality to institutions and human capital, which then affects Schumpeterian entrepreneurship and economic development; the argument being that divisions along ethnic and class lines which inequality engenders may place severe constraints on institutional and policy reforms and, therefore, on the implementation of growth promoting policies that would foster EO.

Fourth, human capital is a robust predictor of EO across all levels of development. In particular, in developing countries it seems to be an important variable that shapes EO. This supports Glaeser et al.'s (2004) point that Western colonizers facilitated technological diffusion and development in their colonies through the higher human capital they possessed. And it contradicts the assertion that similar to the human capital—growth relation, the human capital—EO association might be contingent on: (1) corruption and inequality and (2) the level of development.

Fifth and importantly, across all regressions, we find that EO is a highly persistent series. In other words entrepreneurial orientation today predicts entrepreneurial orientation in the future; and this result is robust to controlling for institutions, human capital and wealth. Lastly, wealth is positively associated with EO amongst low income countries; suggesting that there is a significant within sample variation in this relation amongst this group. And by implication, there might be other factors besides income (such as geography) that might explain this within sample variation of the relationship between EO and institutions and human capital.

4.3 Granger Causality

Overall, the determinants—EO association virtually replicates the determinants—growth relationship that has been well documented in the literature. These findings, combined with theory, strongly suggest that the determinants of growth may, correctly, be the determinants of EO, not growth. However, implicit in asserting or arguing that institutions and policies are determinants of EO is that the direction of the causality runs from institutional and policy variables to EO; or at the very least, it is bi-directional. And, for institutional and policy variables to be said to be antecedents of EO, causality cannot run from EO to institutions and policies. However, so far, our specifications have merely investigated institutions and policies as correlates (focusing on the sign of the association) of EO across varying levels of development; we have not clarified the direction of causality. So a critical step in clarifying the antecedents of EO is carrying out panel Granger block exogeneity tests to determine the direction of causality whilst being sensitive to context as Schumpeterian growth theory postulates[19]. Typically Granger causality tests are quite sensitive to lag length; so we employ 4

[19] We run granger causality tests on the whole sample, middle income countries and low income countries.

different lags (from 1 to 4 lags) and only deem reliable results above the 95% significant level for 3 of 4 lag specifications.

Table 10 presents the causality test results. For the combined sample; our criterion suggests that the control of corruption and the human capital variables, secondary and tertiary education, can be deemed antecedents of EO. Banking development, on the other hand, seems to follow EO. Similarly; inequality seems to be the outcome of variance enhancing entrepreneurship rather than its antecedent. However, as previously noted, the results of the whole sample may not tell the full story since policies and institutions may affect EO differently according to income (development) level.

Splitting the sample into middle-to-high income and low income countries yields results that suggest corruption, banking development and human capital variables are robust antecedents of EO in middle-to-high income countries. However, in low income countries, the situation is reversed — i.e., EO itself seems to be a robust antecedent to the control of corruption, banking development and tertiary education; the association with secondary education is bi-directional. In both samples, on the other hand, there seems to be no Granger causality between EO and inequality. Overall, these results suggest that it is not only the sign of the association between institutions and human capital and EO that is contingent on income (development) level but also the direction of the causality.

Insert Table 10

4.4 Validation: does EO explain growth after controlling for the determinants and the level of EO?

We have clarified the sign and the direction of the association between institutions and human capital, and EO across varying levels of development. And we have argued that clarifying the determinants of EO is important because: (1) EO is a better measure of Schumpeterian entrepreneurship since, unlike entry density, it correlates positively with growth[20], and (2) EO is the conduit through which institutions and human capital may affect growth[21]. These claims are partially supported by determinants—EO association virtually replicating the determinants—growth relationship. Importantly, however, for these assertions to hold there must be a degree of unique variance in growth that is explained by EO even after accounting for the direct growth impact of institutional and human capital variables.

[20] In our view, if EO, similar to entry density, does not correlate positively with the level of income and growth, it would be difficult to justify how it is a better measure of Schumpeterian entrepreneurship than, say, entry density or, for that matter, any other measure of entrepreneurship that is currently thus assumed.

[21] Similarly, for EO to be an important conduit through which institutions and human capital shape growth, there must be residual variance in growth explained by EO that is not directly explicated by institutional and human capital indicators.

Mthanti and Ojah (2017), indeed, confirm that EO subsumes the impact of institutions and human capital on growth. So, in this paper, we ask a different but related question: do EO increments account for the effects of institutions and policies on growth in low and/or medium-and-high EO countries? To put it differently, is there a threshold level of EO above which an increase in EO dominates the impact of institutions and policies on economic growth; and below which institutions and policies might appear to or take on the role of the critical drivers of economic growth (for instance African countries)? We control for the level of EO to assess whether in the effective absence and/or low levels of EO, institutions and/or policies play a more direct role in facilitating growth/development. We split the sample into four quartiles with the lowest 25% of the sample (on the average level of EO over the sample period) belonging to the lower quartile and the highest 25% belonging to the upper quartile. The data between the 25th percentile and the 75th is characterised as the interquartile range. Furthermore, we use a rolling 5-year average growth rate as a measure of the GDP growth and the 5-year change in EO as a measure of the deviation (increment) in EO (EOdev).

The Gini index and tertiary education enrolment, due to data considerations and collinearity with secondary enrolment, respectively, are dropped from the analysis. The residual impact of EO increment on growth, after controlling for institutions and policies, is evaluated using both system-GMM and panel least squares regressions. The usual caveats for panel least squares about endogeneity and omitted variable bias apply. Table 11 reports both system-GMM and panel least squares results of these estimates. As expected, both system-GMM and panel least squares largely confirm our contention that the EO increment (EOdev) is a consistent and robust predictor of GDP growth at low, medium and high levels of EO[22].

Overall, these results, together with the confirmed association between EO and institutions/human capital, largely support the notion that: (1) EO correlates positively with growth and (2) EO seems an important conduit through which institutions and human capital may affect growth, even at low levels of productive capabilities. Furthermore, in agreement with a noteworthy motivation of our study, are the results that speak to whether or not EO and its determinants (which have also been shown to empirically relate to growth) can be assumed as perfect substitutes? According to the results in Table 11, not only is it shown that EO explains a unique residual variance in growth after controlling for direct impacts of institutions and human capital variables, but it also

[22] Model (1) seems to indicate that EO increment is insignificant at low levels of EO. However, a low EO country may have a higher GDP than its productive capabilities would allow – and achieve this mainly, for instance, by financing consumption through accumulating foreign debt, through foreign aid and/or lucking out and discovering huge oil (commodity) reserves. In such instances the level of EO may be negatively related to growth, whereas the EO increment should still positively predict growth after controlling for EO level. In a system-GMM specification similar to model (1) with the additional regressor being the level of EO, we confirm that indeed the level is negatively related to growth, whereas the deviation is a positive and significant predictor of growth at the 5% level.

reveals the relative economic importance of EO and the seemingly competing growth antecedents. One can see that the coefficients of EOdev, across all conditional distribution are markedly higher than corresponding coefficients of all competing antecedents of growth. Therefore, these two sets of growth antecedents, in line with our postulation, cannot be assumed to be perfect substitutes. In fact, one can surmise from the results that, in the event that the two sets are perceived as competing growth antecedents, EO would get the nod of priority in any effective growth strategy.

Insert Table 11

4.4 Further validation: does entry density correlate positively with EO/growth?

In the foregoing, we have argued that inconsistent link between entry density and growth is not surprising since entry density itself is a poor proxy of Schumpeterian entrepreneurship. It is, therefore, important to ascertain the antecedents of EO because, as we have amply argued in preceding sections of this paper, it is a more appropriate measure of growth-enhancing Schumpeterian entrepreneurship, than entry density. Implicit in this observation is that: (1) the relationship between entry density and EO may be inconsistent and (2) the relationship between entry density and the determinants of growth may not be robust.

To ascertain whether our observation and/or postulation is, indeed, the case, we first regress the World Bank's new business density on EO whilst controlling for domestic credit, the control of corruption, Gini index, and secondary education. Second, we regress institutional and policy variables on the TEA and new business density whilst controlling for income. The results of the first regression suggest that secondary education enrollment, the control of corruption, and reduced inequality all have a robust association with EO, whereas entry density does not (results not reported here)[23]. And the second regression confirms our postulation that quality institutions and good policies are not a robust predictor of entry density (See Table 12)[24].

Insert Table 12

5. Discussion and conclusion

We have investigated the relation between Schumpeterian entrepreneurship at the macro-level (EO) and what we argue are its drivers across different levels of development, and confirmed our postulation that institutions and human capital shape EO. Moreover, our robustness tests clearly show that entry density is not, necessarily, a prerequisite for EO/growth. We have therefore addressed what

[23] These results are available from the authors upon request.

[24] Hausmann test results suggests that a random effects estimator is appropriate for the regression with the TEA as the dependent variable; and a fixed effects estimator is appropriate for the regression with the new business density as the dependent variable. We report both random and fixed effects.

we deem to be an oversight in the literature — i.e., the need to ascertain, empirically, the theoretically posited relationships between institutions, human capital and Schumpeterian entrepreneurship.

The results based on our overall sample suggest that contingent on the quality of institutions, both reduced corruption and banking development enhance EO. The inequality—EO relation is not determinate. Human capital, on the other hand, has a strong positive association with EO; and is robust to controlling for institutional quality. However, paying heed to context, as Schumpeterian growth theory counsels, we examine these associations along development levels and document results that suggest the positive association between banking development and the control of corruption, respectively, and EO, hold mainly in middle-to-high income countries. In low income countries, a large banking sector and low corruption may hinder EO.

Importantly, the determinants—EO association, which virtually replicates the determinants—growth relationship, coupled with EO explaining a large degree of unique variance in growth, even at low levels of productive capabilities, support the notion that EO is indeed an important conduit through which determinants of EO engender growth. In addition, EO is a highly persistent series; implying that there might be some self-reinforcing mechanism (network effects) in the EO series and, as a result, investments today in EO may yield positive outcomes well into the future. Based on these findings, we can surmise that: (1) the human capital—EO association is robust, (2) the institutions—EO relation may not be linear, and interestingly, (3) possessing quality institutions may not be a necessary precondition for EO building in low income countries.

It, therefore, follows from our documented findings that for middle-to-high income countries that wish to promote knowledge creation, diffusion and exploitation, and growth, both institutional and human capital development are vital. On the other hand, for low income countries, committing precious limited resources to reducing corruption and/or developing a large banking sector may be sub-optimal because it may yield perverse outcomes. In fact, where Schumpeterian entrepreneurship is hampered by low private returns or a poor institutional environment, the relatively sensible growth policy to follow may be to subsidize EO directly. As Rodrik (2014) notes:

"*Korea and Taiwan directly subsidized exports. Singapore subsidized foreign investors. China created special economic zones and subsidized its exporters both directly and indirectly through an undervalued exchange rate. Mauritius created an export processing zone. In none of these cases did …… across-the-board institutional reforms play a significant causal role in setting off the transition to high growth*".

Therefore, the appropriate policy prescription for enhanced Schumpeterian entrepreneurship, technological upgrading and development, seems clear: invest precious resources in human capital

and in enhancing innovative capabilities, diversifying into risky sectors, and proactively seeking new markets and advanced technology to exploit EO's self-reinforcing network effects — i.e., lofty EO behaviour encourages more lofty EO behaviour. And this self-reinforcing copying and learning, experimenting and learning, and critically, the diffusion of that newly acquired production knowledge, that these investments engender, may be the crucial conduit to sustained continuous growth.

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Table 1: Correlation Matrix of entrepreneurship proxies and determinants

	Corruption	Domestic credit	Gini Index	Secondary	New Bus Density	TEA	EO
Corruption	1.00						
Domestic credit	0.48***	1.00					
Gini Index	-0.35***	-0.16***	1.00				
Secondary	0.55***	0.37***	-0.49***	1.00			
New Bus Density	0.10**	0.22***	0.06	0.18***	1.00		
TEA	-0.38***	-0.36***	0.47***	-0.37***	-0.18**	1.00	
EO	0.65***	0.51***	-0.39***	0.66***	0.09	-0.38***	1.000000

1. ***, **, and * in the table indicate the levels of significance at 1%, 5%, and 10%, respectively.

Table 2: Rankings of EO and its determinants

EO Rank	Country	Mean	Std. Dev.	Control of Corruption	Gini Index	Domestic credit	Tertiary education
1	Singapore	2.46	0.81	9.22	46.02	81.94	32.62
2	Ireland	2.26	0.64	8.38	33.06	87.80	38.00
3	Belgium	1.39	0.32	6.13	27.04	100.38	49.39
4	Switzerland	1.36	0.27	8.64	33.15	164.27	33.45
5	Sweden	1.04	0.46	9.18	24.33	111.74	52.46
6	Japan	1.03	0.16	6.57	29.81	268.54	38.27
7	Netherlands	0.92	0.30	8.85	29.03	134.07	46.47
8	Iceland	0.91	0.49	9.32	25.08	86.71	34.87
9	Denmark	0.85	0.38	9.63	30.75	93.23	47.43
10	Finland	0.80	0.50	9.33	24.08	66.92	68.69
	Selected Developed						
11	United States	0.79	0.21	7.66	40.28	174.73	67.85
13	Germany	0.73	0.22	8.06	27.55	117.41	35.92
16	Canada	0.64	0.31	9.08	30.03	128.05	69.80
21	United Kingdom	0.53	0.18	8.71	31.16	112.39	47.96
38	Portugal	0.13	0.13	6.35	35.78	106.58	37.14
	Selected African						
25	Botswana	0.50	0.18	6.06	NA	-29.73	2.78
52	South Africa	-0.06	0.15	5.03	55.49	130.40	16.98
80	Senegal	-0.64	0.16	3.49	NA	30.24	4.11
92	Lesotho	-1.09	0.63	3.43	NA	9.94	2.18
93	Ethiopia	-1.20	0.27	3.37	39.34	36.06	2.06
	Selected Eastern European and former Soviet Union						
15	Czech Republic	0.67	0.22	4.84	23.95	71.04	23.16
19	Slovenia	0.56	0.29	5.27	23.65	30.39	43.42
33	Russia	0.19	0.19	2.46	37.78	22.68	30.37
66	Georgia	-0.34	0.29	3.36	37.49	11.01	40.11
87	Kyrgyzstan	-0.90	0.19	4.16	39.07	5.04	28.65
	Selected Latin American						
45	Chile	0.04	0.28	7.03	55.21	85.58	28.04
60	Brazil	-0.23	0.11	3.85	58.73	86.00	10.59
63	Argentina	-0.29	0.14	4.09	46.38	37.52	43.56
71	Uruguay	-0.44	0.18	3.95	43.00	50.33	29.85
77	Bolivia	-0.55	0.17	2.96	NA	42.71	29.39
	Selected Asian						
17	Malaysia	0.62	0.42	5.36	47.34	157.74	17.86
31	China	0.22	0.45	2.68	26.24	98.35	7.27
32	Thailand	0.19	0.32	2.90	52.78	112.16	23.75
74	India	-0.49	0.30	2.87	32.32	52.59	7.23
75	Sri Lanka	-0.50	0.16	3.65	NA	41.39	18.65
46	All	0.00	0.74	4.77	37.56	63.29	26.60

Table 3: Correlation matrix of the sub-constructs of EO, EO and its determinants

	EO	Innov	Proact	Risk	Corrupt	Domestic credit	Gini Index	Tertiary education	Secondary education
EO	1.00								
Innov	0.70***	1.00							
Proact	0.76***	0.25***	1.00						
Risk	0.81***	0.35***	0.43***	1.00					
Corrupt	0.67***	0.72***	0.30***	0.42***	1.00				
Domestic credit	0.53***	0.59***	0.18***	0.38***	0.47***	1.00			
Gini Index	-0.40***	-0.44***	-0.12***	-0.27***	-0.35***	-0.16***	1.00		
Tertiary	0.64***	0.64***	0.39***	0.40***	0.52***	0.41***	-0.35***	1.00	
Secondary	0.66***	0.56***	0.35***	0.53***	0.55***	0.37***	-0.49***	0.77***	1.00

Notes:

1. ***, **, and * in the table indicate the levels of significance at 1%, 5%, and 10%, respectively.
2. Innov, Proact and Risk represent innovativeness, proactiveness and risk taking respectively. Corrupt indicates the control of corruption.

Table 4: Correlation matrix of independent variables (combined sample)

	Corruption	Domestic credit	Secondary	Tertiary	Gini Index	GDP per capita
Corruption	1.00					
Domestic credit	0.48***	1.00				
Secondary	0.59***	0.37***	1.00			
Tertiary	0.55***	0.38***	0.78***	1.00		
Gini Index	-0.39***	-0.21***	-0.50***	-0.40***	1.00	
GDP per capita	0.82***	0.57***	0.65***	0.64***	-0.50***	1.00

Notes:

1. ***, **, and * in the table indicate the levels of significance at 1%, 5% and 10%, respectively.
2. GDP per capita is measured in US 2005$.

Table 5: GMM analysis with the determinants as predictors of EO (combined sample)

Dependent variable: EO									
Model:	1	2	3	4	5	6	7	8	9
EO(-1)	0.57 71.88***	0.66 76.51***	0.64 75.39***	0.66 70.38***	0.69 29.28***	0.65 29.31***	0.63 26.73***	0.67 29.89***	0.62 20.11***
Log (GDP)	0.19 11.46***	0.11 6.31***	0.14 6.53***	0.23 9.38***	0.15 3.32***	0.12 2.78***	0.14 3.08***	-	0.10 1.68*
Corruption	-0.08 -12.43***				0.17 13.72***	0.17 12.38***	0.14 8.99***	0.16 9.72***	0.15 9.05***
Domestic credit		-0.00 -1.85**					0.00 6.29***	0.00 9.99***	0.00 8.32***
Tertiary			-0.00 -3.22***			0.00 4.48***		-0.00 -0.58	-0.00 -1.96**
Secondary			0.00 4.53***			0.00 3.11***		0.01 4.98***	0.00 3.47***
Gini Index				-0.00 -7.69***	0.00 0.69	0.00 0.93	0.00 2.64***	0.00 2.03**	0.00 2.08**
Number of observations	1879	1879	1879	1370	1370	1370	1370	1375	1370
J statistic	81.86	82.50	79.70	55.24	55.93	57.43	55.75	59.25	57.07
Prob (J-statistic)	0.33	0.31	0.39	0.35	0.33	0.28	0.34	0.23	0.29
AR(2)	0.19	0.15	0.14	0.19	0.16	0.17	0.15	0.16	0.16
No of cross sections	92	92	92	68	68	68	68	68	68
Instrument rank	80	80	81	55	56	58	57	58	59
N/I	1.15	1.15	1.14	1.24	1.21	1.17	1.19	1.17	1.15

Notes:

1. The dependent variable is EO assessed during the period 1982-2008 using an unbalanced panel with 27 periods included and 93 cross-sections.
2. The regressions including the GINI Index have 27 periods and 68 cross-sections.
3. ***, **, and * in the table indicate the levels of significance of the t-value at 1%, 5% and 10%, respectively

Table 6: Correlation matrix of independent variables (middle-to-high income sample)

	Corruption	Domestic credit	Secondary education	Tertiary education	Gini Index	GDP per capita
Corrupt	1.00					
Domestic credit	0.37***	1.00				
Secondary	0.49***	0.27***	1.00			
Tertiary	0.44***	0.26***	0.70***	1.00		
Gini Index	-0.38***	-0.09***	-0.55***	-0.39***	1.00	
GDP per capita	0.75***	0.50***	0.62***	0.56***	-0.53***	1.00

Notes:

1. ***, **, and * in the table indicate the levels of significance at 1%, 5% and 10%, respectively.
2. GDP per capita is measured in US 2005$.

Table 7: GMM analysis of EO determinants (Middle-to-high income sample)

Dependent variable: EO										
Model:	1	2	3	4	5	6	7	8	9	10
EO(-1)	1.06 31.32***	0.77 44.42***	0.87 57.57***	0.98 142.36***	1.09 43.34***	0.95 24.18***	1.00 36.21***	0.96 37.97***	0.94 35.01***	0.87 16.51***
Log(GDP)	-	-	-	-	-	-	-	-	-	-0.25 -1.34
Corruption	0.47 7.93***				0.47 11.02***	0.55 8.57***	0.55 14.64***	0.44 14.61***	0.50 18.01***	0.39 14.84***
Domestic credit		0.00 7.47***						0.00 3.55***	0.00 1.71*	0.00 4.18***
Tertiary			0.01 7.36***			0.00 1.87*	0.00 2.15**		0.00 1.29	0.00 0.85
Secondary			-0.00 -2.68***			0.00 2.37***	0.00 2.91***		0.00 4.79***	0.00 2.00**
Gini Index				-0.00 -3.39***	-0.00 -0.37		-0.00 -1.61	-0.00 -1.10	-0.00 -1.37	-0.01 -2.81***
Number of observations	1036	1036	1036	888	888	1036	888	888	888	883
J statistic	26.17	28.63	35.53	33.85	27.58	24.85	25.38	28.65	26.26	30.60
Prob (J-statistic)	0.45	0.33	0.10	0.14	0.38	0.53	0.50	0.33	0.45	0.24
AR(2)	0.59	0.26	0.26	0.13	0.21	0.91	0.34	0.23	0.31	0.28
No of cross sections	51	51	51	44	44	51	44	44	44	44
Instrument rank	28	28	29	28	29	30	31	30	32	33
N/I	1.82	1.82	1.76	1.57	1.52	1.70	1.42	1.47	1.38	1.33

Notes:

1. The dependent variable is EO assessed during the period 1982-2008 using an unbalanced panel with 27 periods included and 51 cross-sections.
2. The regressions including the Gini Index have 27 periods and 44 cross-sections.
3. ***, **, and * in the table indicate the levels of significance of the t-value at 1%, 5% and 10%, respectively.

Table 8: Correlations matrix of the independent variables (low income sample)

	Corruption	Domestic credit	Secondary education	Tertiary education	Gini Index	GDP per capita
Corruption	1.00					
Domestic credit	0.09**	1.00				
Secondary	0.14***	-0.02	1.00			
Tertiary	0.09**	-0.02	0.82***	1.00		
Gini Index	0.09**	-0.09**	-0.25***	-0.04	1.00	
GDP per capita	0.29***	0.23***	0.51***	0.49***	0.05	1.00

Notes:

1. ***, **, and * in the table indicate the levels of significance at 1%, 5% and 10%, respectively.
2. GDP per capita is measured in US 2005$

Table 9: GMM analysis of determinants of EO (low income countries sample)

Dependent variable: EO											
Model:	1	2	3	4	5	6	7	8	9	10	11
EO(-1)	0.80 27.23***	0.93 52.03***	0.71 16.21***	0.91 231.71***	0.89 25.36***	0.52 10.24***	0.73 8.63***	0.80 28.43***	0.89 20.15***	0.70 8.59***	0.15 2.12**
Log(GDP)	-	-	-	-	-	-	-	-	-	-	0.59 2.25**
Corruption	-0.14 -7.19***				-0.01 -0.61	-0.13 -5.26***	0.06 1.26	-0.14 -7.28***	-0.01 -0.32	0.61 0.03	-0.12 -4.74***
Domestic credit		-0.00 -2.22**						-0.00 -0.88	-0.00 -2.59***	-0.00 -1.54	-0.01 -3.24***
Tertiary			0.01 3.90***			0.02 4.39***	0.02 3.78***			0.02 3.82***	0.01 1.52
Secondary			0.01 4.14***			0.01 3.94***	0.02 8.40***			0.02 6.88***	0.02 6.10***
Gini Index				-0.00 -3.33***	-0.00 -2.84***		-0.00 -1.07		-0.00 -1.04	-0.01 -3.09***	-0.01 -2.01**
Number of observ	855	855	855	470	470	855	470	855	470	470	470
J statistic	28.03	29.17	25.32	21.68	21.64	23.07	17.55	28.63	20.40	15.97	19.69
Prob (J-statistic)	0.36	0.30	0.50	0.42	0.36	0.63	0.49	0.33	0.37	0.53	0.23
AR(2)	0.61	0.28	0.17	0.90	0.94	0.53	0.81	0.57	0.88	0.42	0.94
No of cross sections	41	41	41	23	23	41	23	41	23	23	23
Instrument rank	28	28	29	23	23	30	23	29	23	23	23
N/I	1.46	1.46	1.41	1	1	1.37	1	1.41	1	1	1

Notes:

1. The dependent variable is EO assessed during the period 1982-2008 using an unbalanced panel with 27 periods included and 41 cross-sections.
2. The regressions including the GINI Index have 27 periods and 23 cross-sections.
3. ***, **, and * in the table indicate the levels of significance of the t-value at 1%, 5% and 10%, respectively.

Table 10: Granger causality tests of EO and determinants

	Combined				**Middle Income**				**Low Income**			
Lag Length	Lag 1	Lag 2	Lag 3	Lag 4	Lag 1	Lag 2	Lag 3	Lag 4	Lag 1	Lag 2	Lag 3	Lag 4
Null Hypothesis:	F-Stat	F-Stat	F-Stat	F-Sta	F-Stat	F-Stat	F-Stat	F-Stat	F-Sta	F-Stat	F-Stat	F-Stat
Domestic Credit does not Granger Cause EO	1.7	1.94	1.77	3.15**	2.75*	7.93***	6.26***	4.47***	0.27	1.19	1.33	2.34**
EO does not Granger Domestic Credit	41.04***	19.00***	11.88***	8.48***	10.60***	5.19***	2.99**	2.96**	15.29***	7.80***	5.33***	3.74***
Control of Corruption does not Granger Cause EO	5.82**	5.27**	7.08***	4.67***	3.83**	6.76***	5.29***	4.15***	3.57*	1.63	3.53***	1.68
EO does not Granger Cause CONTROL_CORRUPTION	16.95***	7.72***	6.30***	4.99***	0.46	0.13	0.14	0.50	3.19**	3.01**	3.49***	3.40***
Secondary Enrolment does not Granger Cause EO	15.36***	7.26***	6.03***	6.24***	10.04***	8.05***	6.4***	5.78***	8.15***	5.22***	3.17**	2.69**
EO does not Granger Cause Secondary Enrolment	13.23***	4.23**	1.38	0.82	0.87	0.33	1.37	1.26	22.19***	16.70***	12.37***	9.70***
Tertiary Enrolment does not Granger Cause EO	23.43***	10.66***	6.89***	5.30***	14.42***	7.70***	4.41***	3.82***	5.72**	2.3**	1.90	1.64
EO does not Granger Cause Tertiary Enrolment	12.91***	7.22***	3.64**	2.79**	0.16	0.36	0.29	1.26	14.33***	8.48**	6.14***	4.68***
Gini Index does not Granger Cause EO	3.05*	2.59*	3.38**	2.89**	1.78	1.45	1.51	1.74	1.02	1.20	1.97	1.61
EO does not Granger Cause Gini Index	13.08***	6.69***	3.23***	2.37**	4.28***	2.06	1.32	1.09	2.74*	2.35	1.48	1.36

1. ***, **, and * in the table indicate the levels of significance of the t-value at 1%, 5% and 10%, respectively.

Table 11: Regression analyses of determinants, EO and growth

DV: GDP Growth	System GMM				Panel Least squares			
	Lower quartile	Interquartile range		Upper quartile	Lower quartile	Interquartile range		Upper quartile
Independent variable	1	2	3	4	5	6	7	8
GDP growth(-1)	0.14	0.16	0.46	0.45	0.80	0.78	0.82	0.84
	1.28	3.76***	5.04***	7.71***	23.80***	43.61***	28.83***	31.58***
Log (GDP)	0.51	0.56	0.08	0.20	0.00	0.00	0.01	0.01
	5.48***	8.29***	0.78	4.95***	-0.33	1.61	3.66**	5.40***
Natural resource rents	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	-1.68*	-1.42	-1.01	2.19**	0.72	1.63	0.85	3.35***
Population growth	0.01	0.01	0.01	-0.03	0.00	-0.02	-0.01	0.00
	0.57	0.59	0.33	-6.20***	-0.37	-6.14***	-3.25***	-1.99**
EOdev	-0.02	0.11	0.16	0.07	0.03	0.08	0.08	0.03
	-0.71	3.02***	6.08***	6.65***	1.99**	5.45***	5.99***	3.07***
Dcredit	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	-3.28***	-2.21**	-0.88	-1.83*	-1.70*	-2.60***	-1.99**	-3.17***
Corruption	0.01	-0.02	-0.02	-0.04	0.01	0.01	0.00	0.00
	0.39	-0.84	-2.16**	-2.54***	1.79*	2.34**	-1.53	-2.07**
Secondary	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	-0.43	0.24	1.62	-2.99***	1.12	-0.41	-1.33	-1.68*
J-statistic	17.74	17.97	15.23	14.03	NA	NA	NA	NA
Prob(J-statistic)	0.22	0.26	0.36	0.52	NA	NA	NA	NA
AR(2)	0.96	0.92	0.61	0.73	NA	NA	NA	NA
N	22.00	23.00	22.00	23.00	NA	NA	NA	NA
I	22.00	23.00	22.00	23.00	NA	NA	NA	NA
N/I	1.00	1.00	1.00	1.00	NA	NA	NA	NA
R-squared	NA	NA	NA	NA	0.85	0.84	0.92	0.91
Adjusted R-squared	NA	NA	NA	NA	0.84	0.83	0.92	0.91

Note:

1. The dependent variable is Gdp growth assessed during the period 1985-2008 using an unbalanced panel with 24 periods included and 23 cross-sections per quartile.
2. ***, **, and * in the table indicate the levels of significance of the t-value at 1%, 5% and 10%, respectively.

Table 12: Regression analyses of the determinants (of entrepreneurship) and measures of entry density

DV:	New Bus density	New Bus density	TEA	TEA
Effects Specification:	Fixed	Random	Fixed	Random
C	-577885.50	-149951.90	43.24	47.62***
	(-1.30)	(-1.67)	(0.91)	(5.68)
Log(GDP)	77998.90	29039.93	-2.89	-4.40***
	(1.38)	(1.58)	(-0.61)	(-4.73)
Control of corruption	-2039.15	-6610.42	-0.58	0.42
	(-0.30)	(-0.80)	(-0.77)	(1.22)
Dcredit	-98.08	2.90	0.00	0.00
	(-0.74)	(0.03)	(0.57)	(0.29)
Secondary	90.09	129.37	0.00	0.01
	(0.31)	(0.44)	(0.25)	(0.81)
GINI coefficient	-1103.01	-368.92	-0.09	-0.01
	(-1.28)	(-0.70)	(-0.97)	(-0.28)
Tertiary	-378.20	-537.58	-0.02	0.00
	(-0.96)	(-1.49)	(-0.30)	(0.13)
R-squared	0.95	0.03	0.90	0.17
Adjusted R-squared	0.93	0.01	0.87	0.15
Mean dependent var	48016.35	5886.10	8.48	1.81
S.D. dependent var	87459.82	22984.87	5.91	2.51
F-statistic	61.74	1.68	32.94	8.08
Prob(F-statistic)	0.00	0.13	0.00	0.00

1. ***, **, and * in the table indicate the levels of significance of the t-value at 1%, 5% and 10%, respectively.

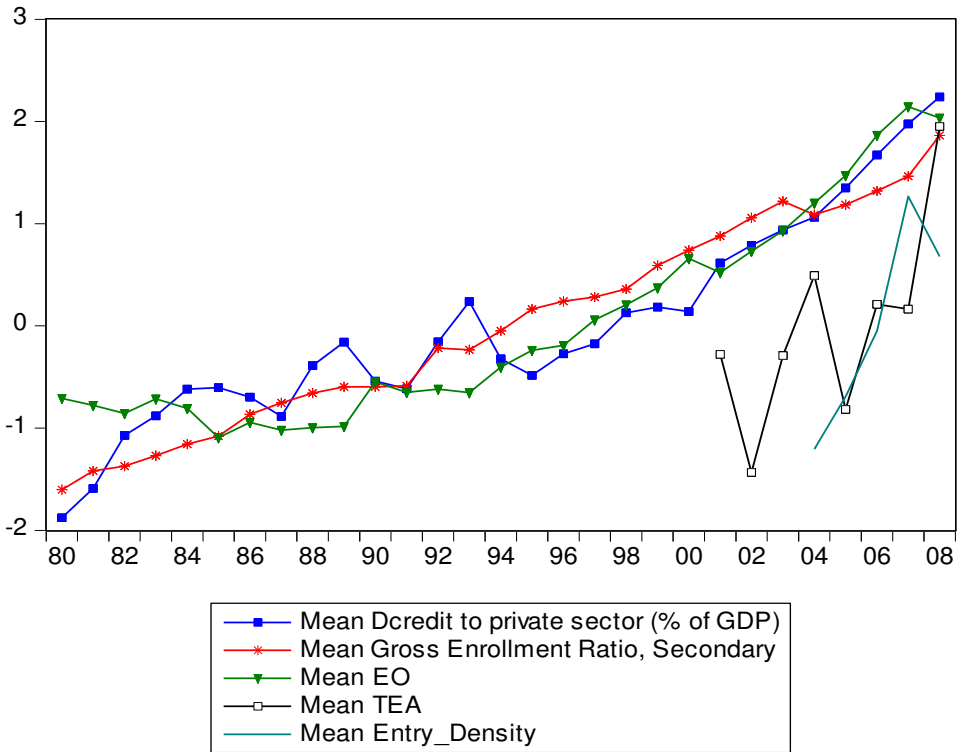

Figure 1: Comparative trends of the determinants, EO and stock measures of entrepreneurship

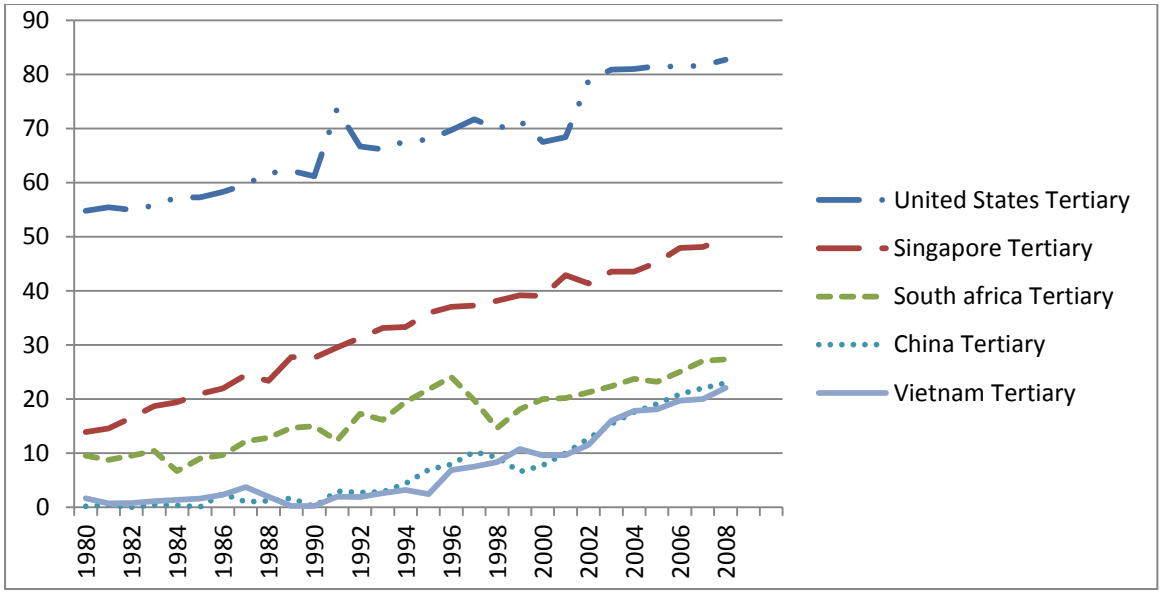

Figure 2: Comparative trends of Tertiary Education

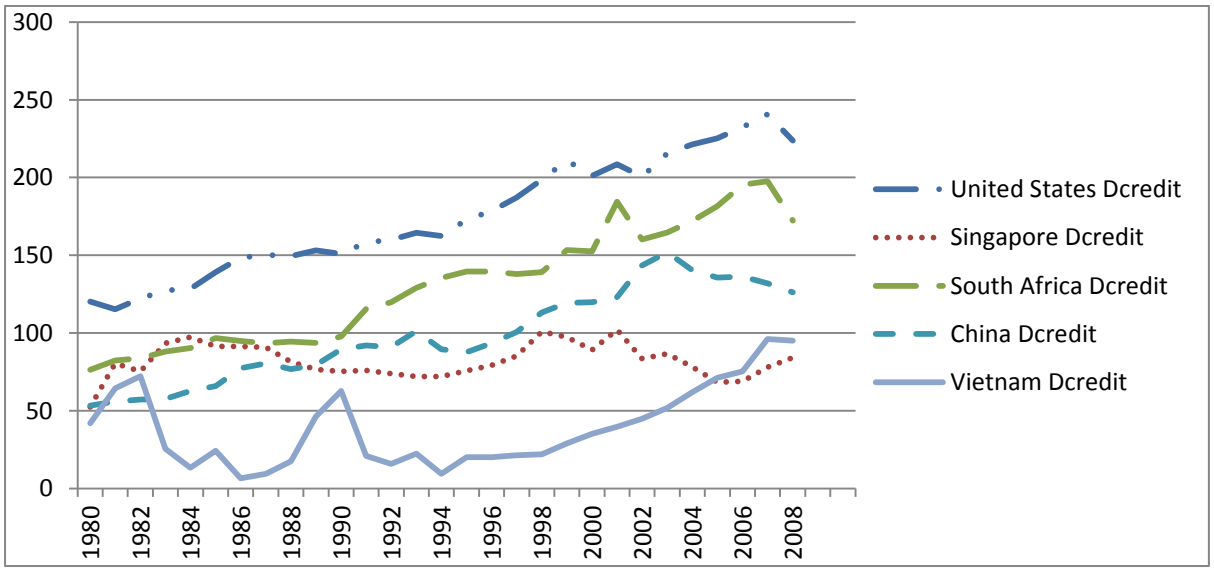

Figure 3: Comparative trends of Domestic Credit

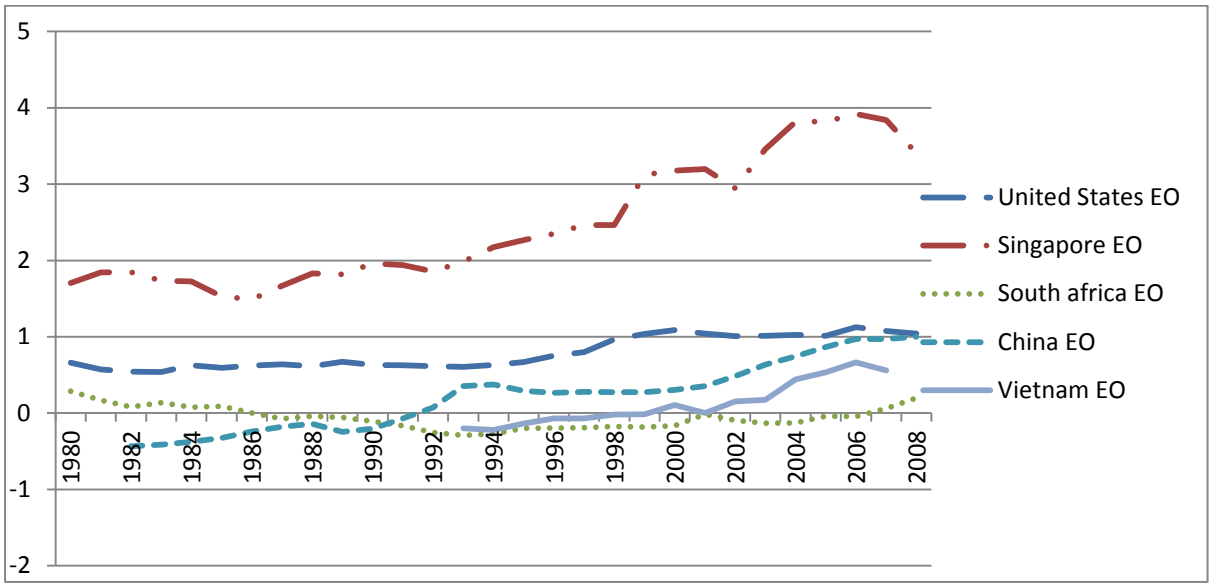

Figure 4: Comparative trends of EO