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ENTREPRENEURSHIP AND REFORMS IN DEVELOPING COUNTRIES

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Entrepreneurship and Reforms in Developing Countries

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Abstract

We examines how institutional and policy reforms affect the relationship between entrepreneurship and growth. We perform Arellano-Bond GMM estimations on annual data (over the period 1990-2002) from a large group of developing countries and focus in particular on the interplay between policy and institutional reforms and entrepreneurship. We find that the joint effect of trade reform and entrepreneurship on growth is negative, suggesting that trade reform diminishes the positive effects of entrepreneurial ability on growth, while the joint effect of financial sector reform and entrepreneurship has a non-linear impact on growth. Financial sector reforms enhance the growth effects of entrepreneurship at initial levels and diminish it a high levels of reform. In addition, we find that the interplay of institutional reform and entrepreneurship does not seem to matter for the growth effects of entrepreneurship.

1. Introduction

The economic literature includes many studies that have demonstrated either theoretically or empirically the positive effects of entrepreneurship on growth and development. The importance of the role of entrepreneurship in less developed economies was often highlighted in the literature on economic development in the postwar period (see for example, Harbison 1956; Papanek, 1962; Baumol, 1968; and Leibenstein, 1968). Indeed, Baumol (1968, p. 66) contends that "[i]f we seek to explain the success of those economies which have managed to grow significantly with those that have remained relatively stagnant, we find it difficult to do so without taking into consideration differences in the availability of entrepreneurial talent and in the motivational mechanism which drives them."

A number of recent studies have focused on the role of institutional and policy reform on growth and development (see for example, Acemoglu et al., 2001, 2002, and 2003; Rodrik et al., 2004; Baliamoune-Lutz and Ndikumana, 2007; and Baliamoune-Lutz, 2008). Since institutional and policy reforms are expected to affect investment decisions and occupational choice, we would expect them to have an impact on entrepreneurship. Institutional reform that affects taxes or liquidity constraints, for example, would have an impact on entrepreneurial activity (Gentry and Hubbard, 2000; Guiso et al., 2007; Djankov et al., 2008). Thus, one channel through which institutional and policy reforms would affect growth could be through their interplay with entrepreneurial activities. Similarly, a possible channel for the effect of entrepreneurship on growth could be its interaction with institutional and policy reforms. Intuitively, we may think that an improvement in trade and financial environments (policy reform) and/or enhanced institutional quality would lead to more entrepreneurial activities, ceteris paribus. It turned out that both theoretically and empirically this may not necessarily be the case.

The primary goal of this paper is to explore how institutional and policy reforms affect the relationship between entrepreneurship and growth. We do so by performing Arellano-Bond GMM estimations on annual data from a group of developing (and transition) countries, covering the period 1990-2002. Our analysis focuses in particular on the interplay between policy and institutional reforms and entrepreneurship (defined in this paper as the ratio of self-employed to total non-agricultural employment, in %). Estimation results indicate that the

interplay of entrepreneurship, and trade and financial sector reforms is important. The empirical results indicate that the joint effect of trade reform and entrepreneurship on growth is negative, suggesting that trade reform reduces the positive effects of entrepreneurial ability, while the joint effect of financial sector reform and entrepreneurship has a non-linear effect on growth. Financial sector reform enhances the growth effects of entrepreneurship within a medium-level range and reduces it at high levels of reform. Moreover, we find that the interplay of institutions and entrepreneurship does not seem to matter for the growth effects of entrepreneurship. The negative relationships between policy (trade and financial sector) reforms and entrepreneurship seem to validate the prediction of the Iyigun-Rodrik theoretical model that institutional reform works best in settings where entrepreneurial activity is weak while policy tinkering works best when entrepreneurial activity is vibrant[1] (Iyigun and Rodrik, 2005) and are consistent with the findings reported in Baliamoune-Lutz (2007).

If we assume that a significant change in a country's openness to trade or in its ratio of credit to the private sector results from policy reform (viewed by Iyigun and Rodrik as institutional reform) instead of policy tinkering, then we may use indicators of trade openness and financial development as proxies for policy reform. In this paper, we consider changes in taxation or money supply, or marginal changes in the structure of tariffs—that do not necessarily lead to significant changes in access to credit or trade openness—as policy tinkering. In this paper, we do not test for the effect of policy tinkering, as the indicators we use are viewed as proxies for policy and institutional reform not policy tinkering. However, while in their empirical estimation, Iyigun and Rodrik (2005) test for the effect of the interplay of entrepreneurship and trade reform only, we test for the interplay of entrepreneurship with institutional, trade, and financial sector reforms. This allows us to try to identify which interactions matter for the growth effects of entrepreneurship.

The remainder of the paper proceeds as follows. Section 2 provides a brief review of the literature on the role of reforms and entrepreneurship in growth and development. Section 3

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[1] See Iyigun and Rodrik (2005) about the distinction between institutional reform and policy tinkering. Also, see the comments about the definition of policy and institutional reforms in Baliamoune-Lutz (2007).

describes the data and methodology. Section 4 discusses the estimation results. Section 5 concludes.

2. Reforms, entrepreneurship, and economic outcomes

In this section, we briefly review recent empirical research on the role of entrepreneurship, and institutional and policy reforms in growth and development. In examining the role of policy reform we focus on financial sector and trade policy reforms primarily because they have been at the forefront of reform programs implemented by developing economies. We also discuss the relevance of the interplay of reforms and entrepreneurial activity.

Financial sector reforms are often implemented with the assumption that such reforms would lead to financial development, which in turn would promote growth and development. Recent empirical research on financial development and growth includes, among others, Demetriades and Hussein (1996), Beck et al. (2000), Benhabib and Spiegel (2000), Levine et al. (2000), and Shan (2005). Many empirical studies have documented that financial development causes growth. However, several others have shown that the evidence is either nonexistent or weak, or that there is reverse causality (see for example, Demetriades and Hussein, 1996; Thornton, 1996; Baliamoune-Lutz, 2003; and Shan, 2005).

Similarly, the topic of the growth effects of trade liberalization and reform has been examined in a number of empirical studies (Sachs et al., 1995; Edwards, 1993 and 1998; Krueger, 1998; Rodriguez and Rodrik, 2000; Dollar and Kraay 2004; Rodrik et al., 2004; Baliamoune, 2002; Baliamoune-Lutz and Ndikumana, 2007). While some studies have shown that trade reforms have a positive impact on growth (see for example, Sachs et al., 1995; Sachs and Warner, 1997; and Dollar and Kraay, 2004), recent empirical studies (for example, Mukhopadhyay, 1999; Rodriguez and Rodrik, 2000; and Baliamoune-Lutz and Ndikumana, 2007) show that the growth effects of trade reforms may be non-existent, not systematic (Rodrik, 2001), or negative. There is also empirical evidence that the effects may be contingent on pre-existing institutional settings (Addison and Baliamoune-Lutz, 2006; Baliamoune-Lutz and Ndikumana, 2007).

The role of institutions in development and growth has also been the subject of numerous studies (North, 1990 and 1991; Knack and Keefer, 1995; Acemoglu et al., 2003; Easterly and Levine, 2003; Dollar and Kraay, 2003; Rodrik et al., 2004; Baliamoune-Lutz and Ndikumana, 2007). For example, Acemoglu et al. (2003) argue that institutions have a significant effect on economic outcomes and on macroeconomic policies. Easterly and Levine (2003) show that institutions are the only channel through which tropics, germs, and crops influence development. Similarly, Rodrik et al. (2004) conclude that there is empirical evidence of the primacy of institutions over trade and geography.

Baliamoune-Lutz (2007) notes, "entrepreneurship affects development through the process of innovation, investment, and market expansion." Leff (1979) writes, "[e]ntrepreneurship clearly refers to the capacity for innovation, investment, and activist expansion in new markets, products, and techniques". Baumol (1968) argues that it is the entrepreneur's job to find new ideas and put them to use. Indeed, the literature on entrepreneurship often stresses 'Schumpeterian entrepreneurship' and focuses on innovation as the main activity of the entrepreneur. Since innovation tends to require access to new technology and/or new ideas, such access can be greatly influenced by institutional and policy reforms.

Banerjee and Newman (1993) develop a theoretical model where capital markets are imperfect—so that wealthy individuals can become entrepreneurs while poor individuals are constrained to work for a wage—and show that the dynamics of occupational choice can influence the process of development through their effect on the distribution of income and wealth. Thus, institutional and financial sector reforms that would alter capital market imperfections could alter the growth effect of entrepreneurship. Moreover, Baliamoune-Lutz (2007) argues that the decision to allocate talent or entrepreneurial ability to productive rather than to unproductive activities[2] could depend on the relative rewards offered by society and "since such rewards are usually governed by pre-existing policies and institutional settings we would expect a significant interaction between the allocation of entrepreneurship to productive

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[2] Baumol (1990), and Colombatto and Melnik (2008) provide insightful discussions of the importance of the distinction between productive and unproductive entrepreneurship.

(or unproductive) activities and policy and institutional reforms." Thus, here again the interplay of reforms and entrepreneurship may influence the growth-effects of entrepreneurship.

The interplay of reforms and entrepreneurship has been examined in the model developed in Iyigun and Rodrik (2005). The authors assume that investment decisions and policy outcomes are subject to uncertainty and use a theoretical model to study the interplay of institutional and policy reform and entrepreneurship, and its impact on growth. Their findings indicate that the impact of institutional reform depends on the level of entrepreneurial activity. More specifically, Iyigun and Rodrik show that institutional reform has negative growth effects when entrepreneurial activity is strong and positive effects when entrepreneurial activity is weak. This is because reforms could impose a cost on the existing entrepreneurs while it may be neutral or even helpful to new ventures.[3]

Using a theoretical model where contractual problems between two entrepreneurs (partners) may arise, Acemoglu and Verdier (1998) show that less developed countries may find it optimal to maintain low property rights and a certain level of corruption. This is because, enforcing property rights can be costly. The authors argue that since it is costly to reduce corruption and enforce property rights, the optimal allocation may also depend on the productivity of entrepreneurial activities. Thus, as Acemoglu and Verdier argue, "it could be optimal for less developed economies, which may have less productive investment opportunities, to have a lower level of property right enforcement and more corruption" (p. 1382). On the other hand, higher public wages can also be part of institutional reform, through their effects on the quality of bureaucracy and the level of corruption. The authors show that an increase in public wages can at the same time enhance the allocation of talent and cause entrepreneurial investment to increase. Acemoglu and Verdier (1998, p. 1383) conclude that "a marginal improvement in the enforcement of property rights secured by higher bureaucratic wages may make it worthwhile for entrepreneurs to invest, increasing the expected return to entrepreneurship. Higher entrepreneurial returns, in turn, induce more agents to choose this occupation rather that public employment."

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[3] Iyigun and Rodrik (2005) take the view that only institutional reforms could have such effect. In this paper we assume that a significant policy change (for example, greater trade liberalization) could produce similar effects in developing and transition economies.

On the other hand, if a country maintains weak institutions, which would cause for example weak property rights, then this may induce individuals from the present generation to invest less in human capital and would not be able to benefit from improved institutional quality once it takes place and thus may vote against institutional reform (Acemoglu and Verdier, 1998). In which case, some countries may persistently have low institutional quality and low investment. This, in turn, may suggest that in such countries, a large part of the self-employment will take place in the informal sector (remedial or subsistence entrepreneurial activity) where the level of human capital is generally low.

3. Data and methodology

The dependent variable is defined as the rate of growth in per-capita income. We follow Iyigun and Rodrik (2005) and Baliamoune-Lutz (2007) and define the variable entrepreneurial intensity (ENT) as the ratio of self-employed to total non-agricultural employment[4] (data are from LABORSTA dataset, *International Labour Organization*). The proxy for trade reforms (OPEN) is openness to international trade, measured by the ratio of the sum of imports and exports to GDP, in %. In this paper, financial sector reform is proxied by domestic credit to the private sector (the variable CREDIT) as a percentage of GDP.[5] Our proxy for institutional reform (the variable ICRG) is the International Country Risk Guide composite index.[6] ICRG ratings are published by the Political Risk Services (PRS) Group and include economic, political, and financial risk. These three categories of risk include scores for 22 risk components. The ICRG composite index is from *World Development Indicators* database. The index has values ranging

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[4] As noted in Baliamoune-Lutz (2007), some studies have argued that an increase in self-employment in developing countries may indicate an increase in informal activities, often as a result of the inability of less-skilled workers to find jobs in the formal sector (Gong and Soest 2002). In this paper as in Baliamoune-Lutz (2007), we do not analyze the extent to which self-employment is part of the formal sector. Also, several recent studies have used data from the Global Entrepreneurship Monitor (GEM). However, GEM data does not include panel data for a sufficiently large sample of developing countries.

[5] Several studies have stressed the role of capital-market constraints in preventing entrepreneurship by low-wealth agents (see for example, Holtz-Eakin et al., 1994; Blanchflower and Oswald, 1998; and Hurst and Lusardi, 2004).

[6] Studies that have used the ICRG composite index or specific ICRG index components—such as the rule of law, democratic accountability, or the quality of bureaucracy—as proxies for the quality of institutions or institutional reform include La Porta et al., 1998; Acemoglu et al., 2001; and Brautigam and Knack, 2004.

from zero (highest risk) to 100 (lowest risk). Data, except for data on the variable ENT, are from the World Bank *World Development Indicators* database.

We initially include 44 developing and transition, economies. We then try to test the robustness of our results by excluding countries that used to be in the group of developing countries but are currently included in the high-income (developed countries) group, such as Singapore and South Korea for example, and excluding sub-Saharan African countries. The choice of the countries is dictated by data availability. The choice of the period (1990-2002) is dictated by the need to minimize cross-country disparity in the number of observations per country, since many developing countries do not have data on ENT prior to the 1990s, and to exclude the pre-transition period for Central and Eastern European countries.

We perform Arellano-bond GMM estimations on annual (unbalanced) panel data covering the period 1990-2002 and report the estimation results in Tables 2-5, along with the tests for the validity of instruments (Sargan test) and second-order autocorrelation. Based on the test results, we fail to reject the null in the case of both tests and all estimations. Thus, we conclude that there is not enough evidence to reject the hypothesis that the instruments are valid and the hypothesis that the average autocovariance in residuals of order 2 is zero.

Let us consider the following dynamic panel data model

$$y_{i,t} = d + a y_{i,t-1} + \mathbf{X}_{i,t} \beta + \eta_i + \mu_{i,t} \qquad (1)$$

where y is the rate of growth in income per capita, $\mathbf{X}$ is a row vector of the endogenous and exogenous factors determining income, η_i is the individual (country) fixed effect, and $\mu_{i,t}$ is a time-varying error term. Then we apply the Arellano-Bond specification and obtain the following:

$$\mathbf{D} y_{i,t} = \mathbf{D} y_{i,t-1} a + \mathbf{D} \mathbf{X}_{i,t} \beta + \mathbf{D} \mu_{i,t} \qquad (2)$$

The variables (on the right-hand side), INVEST (domestic investment as a ratio of GDP, in %), ENT, ICRG, OPEN, and CREDIT. These variables, as well as their interactions, are considered

to be endogenous. In addition to the endogenous variables, we control for the level of development by including per-capita income, and we also include a regional dummy for Latin America.[7]

4. Empirical results

Figure 1-4 show scatter plots of pooled data from our full sample. Figure 1 suggests that there is no positive linear correlation between income growth and self-employment. Figure 4 suggests that there is no significant linear correlation between self-employment and credit to private sector. Figures 2 and 3 suggest that there is some linear association between self-employment, and openness to trade and institutions, respectively.

Table 1 shows relevant correlation coefficients. We observe that the correlation between most variables and growth is rather weak. The highest correlation (0.35) that growth has is with the measure of institutional quality (ICRG). On the other hand, per capita income has strong positive linear correlation with ICRG, and weaker correlation with the investment ratio, openness to trade, and the indicators of financial reform (M2 and credit to the private sector). Interestingly, the association between entrepreneurship (ENT) and the other variables is consistently negative and in some cases strong; -0.69 with income, and -0.45 with institutions and openness to trade.

The Arellano-Bond GMM estimation results are reported in Tables 2-5. First, we estimate the equations using the full sample (44 countries) and show the results in Table 2. Equation (1) portrays a simple model where we regress growth in per-capita income on the investment ratio (INVEST), institutional reform (ICRG), trade reform (OPEN), financial reform (CREDIT) and entrepreneurial intensity (ENT). We also control for the level of per-capita income and include a dummy variable for Latin America. The results indicate that investment and institutional reform seem to have, as expected, a positive effect on growth. On the other hand, trade reforms and entrepreneurship do not seem to have an impact, while the proxy for financial reform shows up with a negative and highly significant coefficient. The coefficient on income is not significant,

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[7] All equations have also been estimated using dummy variables for Asia, transition economies, and sub-Saharan Africa (in separate estimations). Dummy variables for Asia and sub-Saharan Africa were statistically insignificant and the dummy for transition economies had a statistically significant positive coefficient. All conclusions on the relationships between the other RHS variables and growth remain unchanged.

whereas the coefficient on the dummy for Latin America is negative and marginally significant (at the 10-percent level).

In equation (2), we account for the interplay of reforms (trade and financial reform) and entrepreneurial intensity. The results indicate that in both cases the interaction between these variables has a negative impact on growth, suggesting that reforms reduce the growth-enhancing effects of entrepreneurial activity. Note that in equation (2) the variables ENT and OPEN have a positive and highly significant coefficient, while the coefficient on the variable CREDIT is no longer significant (and is positive).[8]

In equations (3)-(5) we examine the growth effect of the interplay of institutional reform (ICRG) and ENT and also test for the presence of non-linearity. There is support for a non-linear effect but only in the case of the interaction between financial reforms and entrepreneurship. Based on the results displayed in Table 2, we may conclude that the interplay of trade reforms and entrepreneurship has negative effects on growth if entrepreneurship is already vibrant and positive effects if entrepreneurial intensity is low.

Given that our full sample includes countries that have recently been added to the group of high income countries (for example, South Korea and Singapore) we adjust the sample by excluding all countries that are currently part of the high-income group. We re-estimate the equations and report the results in columns (1)-(3) of Table 3. Next, we exclude sub-Saharan African countries and re-estimate the equations. We report the results in columns (4)-(6) in Table 3. The results are similar to those reported in Table 2 and, thus, we draw the same conclusions.

An alternative way to test this implication of the Iyigun-Rodrik theoretical model is to assess whether the interplay between the square of entrepreneurship and reforms is significant. We do this and report the results in Tables 4 and 5. The estimates in Table 4 where we use the full sample, and Table 5 where we exclude high-income countries[9] indicate that the interplay of the

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[8] All equations were also estimated using M2 instead of credit to the private sector (results are omitted from the paper but may be obtained from the author) and the conclusions are the same.
[9] Excluding SSA also yields similar results. Results are not reported in the paper but may be obtained from the author upon request.

variable ENT squared and each of the reform proxies is statistically non-significant. It is important to note that the conclusions we outlined based on the previous results (Tables 2 and 3) remain strongly valid. In addition, we tried to control for human capital (results are not reported in the paper) by including total literacy rates and male and female literacy rates, as well as fertility rates but the coefficients on all these variables are statistically insignificant, and the previous conclusions remain the same. Thus, based on these results we may conclude that the growth effects of entrepreneurship seem, indeed, to depend on policy reform.[10]

5. Conclusion

This paper examines the interplay of institutional and policy reforms and entrepreneurship, and explores its effect on growth. More specifically, we test an important implication of the Iyigun-Rodrik model (Iyigun and Rodrik, 2005); that institutional reform would have negative (positive) effects if the pre-existing entrepreneurial activity is vibrant (weak), while 'policy tinkering' will have a positive (negative) effects if pre-existing entrepreneurial activity is vibrant (weak). We do so primarily by using panel data from developing and transition economies and estimating Arellano-Bond GMM growth equations where we include proxies for entrepreneurial intensity and institutional and policy reforms, as well as their interactions.

We find that the interplay of entrepreneurship and policy reforms has an influence on the growth effects of entrepreneurship. We show that the joint effect of trade reform and entrepreneurship on growth is negative, suggesting that trade reform diminishes the positive effects of entrepreneurial ability on growth if entrepreneurial activity is vibrant. We find that the interplay of financial sector reform and entrepreneurship has a non-linear effect on growth. Financial reforms enhance the growth effects of entrepreneurship initially and diminish it high levels of reform. Moreover, we show that the interplay of institutions and entrepreneurship does not seem to matter for the impact on growth.

The results related to the interplay of trade reform and entrepreneurial intensity are consistent with those derived in Baliamoune-Lutz (2007) and Iyigun and Rodrik's (2005) empirical

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[10] An alternative interpretation could be that the growth effects of policy reform may depend on the level of pre-existing entrepreneurships.

estimation (although Iyigun and Rodrik view changes in openness to trade as institutional reform) using cross-sectional data from a group of developed and developing countries. However, in contrast to Iyigun and Rodrik's results, we show that once we control for the interplay of reforms and entrepreneurship, the indicators of institutional reform, trade reform, and entrepreneurship (separately) all have a positive effect on growth and are robustly significant. Iyigun and Rodrik find a negative and statistically significant (at the 5-percent level) coefficient on entrepreneurial intensity. With regard to the interplay of institutional reform and entrepreneurship, and at least in the case where we control for the interaction between ENT squared and ICRG, the findings in the present paper are different from those derived in Baliamoune-Lutz (2007) where the author uses a sample of developed and developing countries and shows that this interplay has a positive effect on growth, implying that institutional reform could enhance the growth effects of entrepreneurship. It is possible that these differences stem from the fact that developed countries have much better institutions and thus the disparity in institutional reform would be more significant in a sample that includes developing and developed countries.

In this paper, we consider changes in taxation or money supply, or changes in tariff structure that do not necessarily lead to significant changes in access to credit or trade openness as policy tinkering. In our model, we did not test for the effect of policy tinkering, as the policy and institutional quality proxies we use are viewed as proxies for policy and institutional reform not policy tinkering. In their empirical analysis, Iyigun and Rodrik (2005) examine the impact of the interplay of entrepreneurship and trade reform only. In our estimations, we test for the interplay of entrepreneurship with institutional, trade, and financial sector reforms. This enables us to try to assess which interactions matter for the growth effects of entrepreneurship.

In summary, the empirical results suggest that trade and financial reforms can reduce the growth effects of entrepreneurship, although financial reforms seem to have a positive effect in early stages (low doses) of reform. On the other hand, institutional reform does not seem to influence the growth effects of entrepreneurship. Overall, these findings seem to be consistent with the predictions and arguments developed in Iyigun and Rodrik's (2005) theoretical model, if one assumes that a change in a country's openness to trade or in its ratio of credit to the private sector

result from policy reform (also viewed by Iyigun and Rodrik as institutional reform), not policy tinkering. The growth effects of entrepreneurial activity seem to depend on pre-existing levels of entrepreneurship and on policy reforms. In settings where entrepreneurial activity is vibrant, reforms could have a negative outcome, while in settings with weak entrepreneurial activity reforms would enhance the growth effects of entrepreneurship. It is possible for example, that in settings where entrepreneurial activity is strong, a trade or credit market reform would induce the incumbents to bribe or be part of other rent seeking activities to access input or output markets, or to eliminate possible competition (new entrants) which would have a negative effect on growth.

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Figure 1

Growth and entrepreneurship
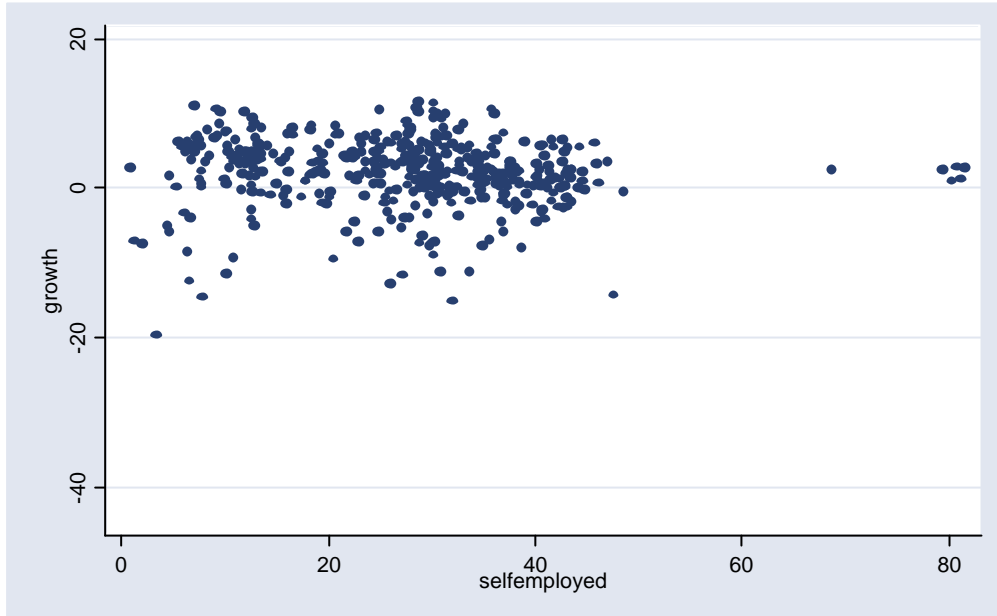
growth = -0.030selfemployed + 2.903   R-squared = 0.007
              (-1.82)   (5.78)

Figure 2

Entrepreneurship and openness to trade
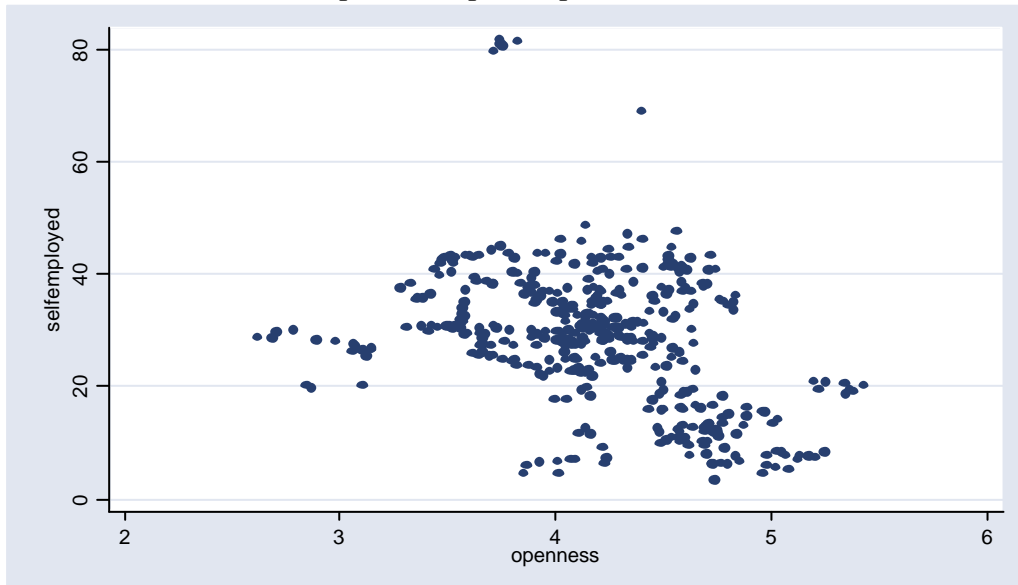
selfemployed = -9.893openness + 69.708   R-squared = 0.16
                    (-9.10)   (15.16)

Figure 3

Entrepreneurship and institutions
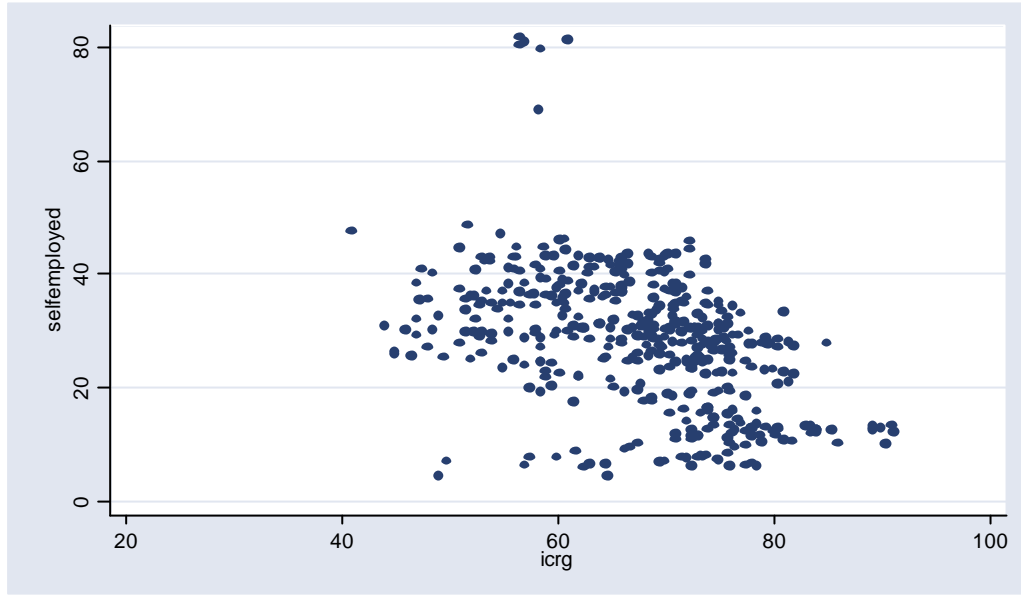
selfemployed = -0.576icrg + 67.221   R-squared = 0.21
              (-10.61)   (18.10)

Figure 4

Entrepreneurship and credit to private sector
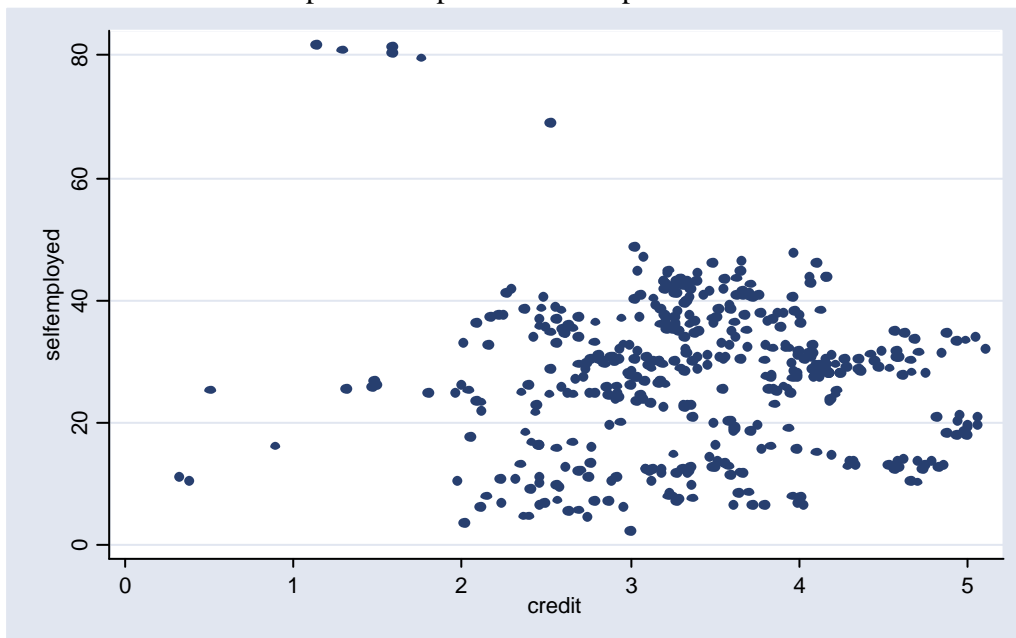
selfemployed = -1.170credit + 31.446   R-squared = 0.10
              (-1.63)   (12.56)

Table 1

Correlation coefficients
(pvalue)

Pooled data

	ENT	GROWTH	INCOME	ICRG	OPEN	INVEST	CREDIT
GROWTH	-0.0085						
	(0.069)						
INCOME	-0.691	0.062					
	(0.000)	(0.079)					
ICRG	-0.453	0.347	0.605				
	(0.000)	(0.000)	(0.000)				
OPEN	-0.448	0.038	0.213	0.413			
	(0.000)	(0.295)	(0.000)	(0.000)			
INVEST	-0.294	0.286	0.316	0.420	0.418		
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		
CREDIT	-0.112	0.102	0.350	0.413	0.257	0.422)	
	(0.017)	(0.007)	(0.000)	(0.000)	(0.000)	(0.000)	
M2	-0.203	0.103	0.274	0.410	0.383	0.457	0.769
	(0.000)	(0.005)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Source: Data on ENT are form LABORSTA dataset produced by *International Labour Organization.* All other data are form World Bank *World Development Indicators* database (2005).

ENT: Entrepreneurial intensity, defined as the percentage of self-employment in total non-agricultural employment.

INCOME (per capita): GDP per capita, PPP (constant 1995 international $). Purchasing-power-parity value of income per capita in 1995 constant international dollars. PPP GDP is gross domestic product converted to international dollars using purchasing power parity rates.

GROWTH: The rate of annual growth in income per capita.

OPEN: Openness to trade, the sum of imports and exports as a % of GDP.

ICRG: International Country Risk Guide rating, published by the Political Risk Services (PRS) Group and includes three subcategories of risk; economic, political, and financial risk. These categories include scores on of 22 risk components. The World Bank publishes composite scores with values ranging from zero (highest risk) to 100 (lowest risk).

CREDIT: Domestic credit to private sector (% of GDP), refers to financial resources provided to the private sector, such as through loans, purchases of nonequity securities, and trade credits and other accounts receivable, that establish a claim for repayment. For some countries these claims include credit to public enterprises.

M2: Broad money (M1 plus M2) as a percentage of GDP

INVEST: domestic investment as a percentage of GDP.

Table 2

Arellano-Bond GMM Estimation, full sample (Dependent variable: Growth of income per-capita)

	(1)	(2)	(3)	(4)	(5)
Growth (lagged)	0.079*	0.046	0.014	0.018	0.019
	(0.045)	(0.044)	(0.044)	(0.044)	(0.044)
Endogenous variables					
INVEST	0.196***	0.183***	0.222***	0.218***	0.218***
	(0.038)	(0.056)	(0.056)	(0.056)	(0.056)
ICRG	0.288***	0.299***	0.302***	0.265***	0.271**
	(0.040)	(0.037)	(0.037)	(0.101)	(0.107)
OPEN	1.194	11.559***	10.591***	10.448***	10.405***
	(1.339)	(2.967)	(2.930)	(2.931)	(2.947)
ENT	-0.021	1.878***	2.322***	1.317***	1.270**
	(0.080)	(0.420)	(0.882)	(0.466)	(0.466)
CREDIT	-3.267***	1.303	3.091	3.088	3.059
	(0.774)	(1.883)	(1.901)	(1.917)	(1.928)
ENT X OPEN		-0.353***	-0.774**	-0.318***	-0.316***
		(0.094)	(0.387)	(0.093)	(0.094)
ENT X CREDIT		-0.137***	0.154*	0.143	0.142
		(0.053)	(0.089)	(0.090)	(0.090)
ENT X OPEN_SQ			0.055		
			(0.045)		
ENT X CREDIT_SQ			-0.054***	-0.052***	-0.052***
			(0.013)	(0.013)	(0.013)
ENT X ICRG				0.0013	0.0028
				(0.003)	(0.009)
ENT X ICRG_SQ					-0.0001
					(0.0007)
Exogenous variables					
INCOME (initial)	-0.116	-0.263**	-0.227**	-0.235**	-0.232**
	(0.111)	(0.112)	(0.111)	(0.112)	(0.113)
LAAM	-0.226*	-0.221**	-0.209*	-0.246**	-0.246**
	(0.114)	(0.112)	(0.111)	(0.110)	(0.111)
TRANSITION					
Number of obs.	345	345	345	345	345
Sargan test[a], chi2	390.64	390.82	387.55	388.58	388.58
M2[b], z ; [pr > z]	-1.04 [0.30]	-1.33 [0.18]	-1.36 [0.17]	-1.38 [0.17]	-1.37 [0.17]

[a] Sargan test of over-identifying restrictions (Null: Instruments are valid).
[b] Arellano-Bond test that average autocovariance in residuals of order 2 is 0.
The constant is not reported

Source: Data on ENT are form LABORSTA dataset produced by *International Labour Organization.* All other data are form World Bank *World Development Indicators* database.

Variable definition: See Table 1.

Table 3

Arellano-Bond GMM Estimation (Dependent variable: Growth of income per-capita)

	Excluding high-income countries			Excluding high-income countries and SSA		
	(1)	(2)	(3)	(4)	(5)	(6)
Growth (lagged)	0.005	0.009	0.007	-0.008	-0.003	-0.006
	(0.046)	(0.046)	(0.046)	(0.047)	(0.047)	(0.047)
Endogenous variables						
INVEST	0.280***	0.276***	0.277***	0.295***	0.290***	0.292***
	(0.059)	(0.059)	(0.060)	(0.062)	(0.062)	(0.062)
ICRG	0.306***	0.277***	0.248**	0.308***	0.290**	0.259**
	(0.037)	(0.105)	(0.110)	(0.038)	(0.112)	(0.117)
OPEN	10.183***	10.073***	10.299***	10.299***	10.728***	10.888***
	(3.012)	(3.017)	(3.034)	(3.034)	(3.230)	(3.245)
ENT	2.223***	1.379***	1.673***	1.983**	1.115*	1.400**
	(0.881)	(0.482)	(0.575)	(0.930)	(0.584)	(0.656)
CREDIT	3.683*	3.750*	3.931*	2.223	2.355	2.537
	(2.102)	(2.108)	(2.122)	(2.122)	(2.534)	(2.550)
ENT X OPEN	-0.713*	-0.322***	-0.335***	-0.769*	-0.353***	-0.363***
	(0.389)	(0.094)	(0.095)	(0.297)	(0.099)	(0.101)
ENT X CREDIT	0.177*	0.166*	0.172*	0.359**	0.343**	0.355**
	(0.093)	(0.093)	(0.094)	(0.148)	(0.148)	(0.149)
ENT X OPEN_SQ	0.047			0.050		
	(0.045)			(0.047)		
ENT X CREDIT_SQ	-0.063***	-0.061***	-0.064***	-0.085***	-0.082***	-0.085***
	(0.014)	(0.013)	(0.014)	(0.018)	(0.018)	(0.019)
ENT X ICRG		0.001	-0.008		0.0006	0.009
		(0.003)	(0.0100)		(0.003)	(0.010)
ENT X ICRG_SQ			0.0001			0.0001
			(0.0001)			(0.0001)
Exogenous variables						
INCOME (initial)	-0.322**	-0.330***	-0.348***	-0.323**	-0.338**	-0.355***
	(0.126)	(0.127)	(0.129)	(0.131)	(0.134)	(0.134)
LAAM	-0.236*	-0.265*	-0.268**	-0.245*	-0.276**	-0.282**
	(0.121)	(0.119)	(0.119)	(0.126)	(0.119)	(0.126)
TRANSITION						
Number of obs.	318	318	318	299	299	299
Sargan test[a], chi2	346.26	346.93	344.17	331.05	331.54	328.48
M2[b], z ; [pr > z]	-1.22 [0.22]	-1.22 [0.22]	-1.17 [0.24]	-1.23 [0.22]	-1.24 [0.21]	-1.19 [0.23]

[a] Sargan test of over-identifying restrictions (Null: Instruments are valid).
[b] Arellano-Bond test that average autocovariance in residuals of order 2 is 0.
The constant is not reported

Source: Data on ENT are form LABORSTA dataset produced by *International Labour Organization.* All other data are form World Bank *World Development Indicators* database.

Variable definition: See Table 1.

Table 4

Arellano-Bond GMM Estimation (Dependent variable: Growth of income per-capita)
Including ENT squared and its interaction with other variables

	Full sample			
	(1)	(2)	(3)	(4)
Growth (lagged)	0.017	0.018	0.0459	0.019
	(0.044)	(0.044)	(0.044)	(0.044)
Endogenous variables				
INVEST	0.215***	0.213***	0.184***	0.215***
	(0.056)	(0.055)	(0.057)	(0.056)
ICRG	0.304***	0.304***	0.299***	0.249**
	(0.036)	(0.036)	(0.037)	(0.106)
OPEN	10.216***	10.430***	11.557***	10.443***
	(2.983)	(2.922)	(2.971)	(2.934)
ENT	1.427***	1.371***	1.876***	1.348***
	(0.437)	(0.430)	(0.421)	(0.471)
CREDIT	3.025	2.090	1.467	3.094
	(1.900)	(2.106)	(2.145)	(1.919)
ENT X OPEN	-0.296***	-0.322***	-0.352***	-0.320***
	(0.104)	(0.093)	(0.095)	(0.093)
ENT X CREDIT	0.144	0.243*	0.149	0.144
	(0.089)	(0.133)	(0.093)	(0.090)
ENT X CREDIT_SQ	-0.052***	-0.056***		-0.052***
	(0.013)	(0.014)		(0.013)
ENT X ICRG				0.028
				(0.044)
ENT_SQ X OPEN	-0.0005			
	(0.001)			
ENT_SQ X CREDIT		-0.001	-0.0002	
		(0.001)	(0.001)	
ENT_SQ X ICRG				-0.0003
				(0.0005)
Exogenous variables				
INCOME (initial)	-0.249**	-0.253**	-0.261**	-0.245**
	(0.112)	(0.111)	(0.114)	(0.113)
LAAM	-0.239**	-0.238**	-0.221**	-0.242**
	(0.110)	(0.110)	(0.112)	(0.111)
Number of obs.	345	345	345	345
Sargan test[a], chi2	389.02	389.93	389.63	387.65
M2[b], z ; [pr > z]	-1.38 [0.17]	-1.36 [0.18]	-1.32 [0.19]	-1.36 [0.17]

[a]Sargan test of over-identifying restrictions (Null: Instruments are valid).
[b] Arellano-Bond test that average autocovariance in residuals of order 2 is 0.
The constant is not reported

Source: Data on ENT are form LABORSTA dataset produced by *International Labour Organization.* All other data are form World Bank *World Development Indicators* database.

Variable definition: See Table 1.

Table 5

Arellano-Bond GMM Estimation (Dependent variable: Growth of income per-capita)
Including ENT squared and its interaction with other variables
and <u>excluding high-income countries from the sample</u>

	(1)	(2)	(3)
Growth (lagged)	0.087	0.042	0.009
	(0.044)	(0.047)	(0.046)
Endogenous variables			
INVEST	0.273***	0.228***	0.273***
	(0.059)	(0.060)	(0.059)
ICRG	0.308*** (0.037)	0.302*** (0.038)	0.261** (0.110)
OPEN	9.967***	11.299***	10.071***
	(3.063)	(3.072)	(3.020)
ENT	1.462***	1.998***	1.402***
	(0.446)	(0.434)	(0.485)
CREDIT	3.706*	2.749*	3.702*
	(2.102)	(2.472)	(2.113)
ENT X OPEN	-0.309***	-0.356***	-0.324***
	(0.105)	(0.095)	(0.094)
ENT X CREDIT	0.167*	0.217**	0.168*
	(0.092)	(0.103)	(0.093)
ENT X CREDIT_SQ	-0.061***		-0.061***
	(0.013)		(0.013)
ENT X ICRG			0.003
			(0.004)
ENT_SQ X OPEN	-0.0003		
	(0.001)		
ENT_SQ X CREDIT		-0.0007	
		(0.001)	
ENT_SQ X ICRG			-0.0003
			(0.001)
Exogenous variables			
INCOME (initial)	-0.343***	-0.339***	-0.341***
	(0.127)	(0.128)	(0.129)
LAAM	-0.258**	-0.236**	-0.261**
	(0.119)	(0.121)	(0.119)
Number of obs.	318	318	318
Sargan test[a], chi2	347.18	350.70	345.96
M2[b], z ; [pr > z]	-1.23 [0.22]	-1.19 [0.24]	-1.21 [0.23]

[a] Sargan test of over-identifying restrictions (Null: Instruments are valid).
[b] Arellano-Bond test that average autocovariance in residuals of order 2 is 0.
 The constant is not reported

Source: Data on ENT are form LABORSTA dataset produced by *International Labour Organization.*
All other data are form World Bank *World Development Indicators* database.

Variable definition: See Table 1.