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The Role of Entrepreneurship in Economic Growth

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Abstract

This study confirms that the level of entrepreneurship in a given country has a significant positive effect on the level of economic growth in that country. Contrary to some established theories, this study has found evidence that the level of entrepreneurship in a given country is not explained by the levels of the traditional causes of economic growth in that country (specifically the amounts of labor, capital, and knowledge that a country possesses as well as the presence or absence of market friendly government policies). Instead, entrepreneurship acts as an independent factor.

Keywords

entrepreneurship, economic growth

Cover Page Footnote

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Introduction

One of the most important goals of contemporary economics is determining the factors that cause economic growth. Traditional neoclassical theory holds that the economic growth of a country is determined by the supplies of both labor and capital the country possesses and the level of technology present in that country (Todaro and Smith, p.129). Some neoclassical economists have suggested that both knowledge and pro-market government policies also have a significant influence on economic growth (Audretsch and Kielbach, p. 605; Todaro and Smith, p. 130). The level of technology in a given society is heavily dependent on the level of knowledge in that society; this paper will regard these two factors as essentially the same. The established neoclassical factors of economic growth are thus the levels of capital and labor present in a given society, the level of knowledge (or technology) present in that society, and the extent to which the government of that society pursues pro-market government policies. However, this model ignores any direct effect that entrepreneurship may have on economic growth.

This paper will provide evidence that entrepreneurship should be included as an important cause of economic growth independent of the other factors. We will begin with a review of relevant literature, and then move to an overview of the data and variables used along with a description of the statistical methodology. We present the analysis of the relevant empirical results and end with a conclusion detailing possible directions for future research. It is important to note that, for the purposes of this paper, entrepreneurship will be defined as simply the number of new businesses formed in a given time period. Innovation will be defined as the creation of previously unknown economically profitable ideas.

Literature Review

The traditional neoclassical theory of economic growth was first developed by Robert Solow in his 1956 paper "A Contribution to the Theory of Economic Growth" (Todaro and Smith, p. 128 and p. 139). In this paper, Solow argues that economic growth is a function of two inputs- the levels of capital and labor in a given area. The exact nature of this function is determined by the technological possibilities available to the society in question (Solow, p. 66).Thus, under this theory, the economic growth of a given country is determined by the amounts of labor and capital that country possesses and the technological possibilities to which that country has access (i.e., the level of knowledge within that country).

More recently, many economists have come to believe that market-friendly government policies are another important cause of economic growth. Hans Pitlik opens his paper "The Path of Liberalization and Economic Growth"

by saying that numerous empirical studies have shown that pro-market government policies have a positive effect on the economic growth of a given country. His explanation for this is that pro-market policies increase the benefits individuals receive for performing activities that are conducive to economic growth (Piltik, p.57). This theory implies that entrepreneurship may be significantly influenced by market-friendly government policies.

This theory is supported by the findings of Matthieu Chemin in his article "The Impact of the Judiciary on Entrepreneurship: Evaluation of Pakistan's 'Access to Justice Programme'." In this article, Chemin finds that a 2002 reform of the Pakistani judicial system resulted in a significant increase in the level of entrepreneurial activity there (Chemin, p.114). This suggests that some government policies can increase entrepreneurship, and that entrepreneurship is influenced by at least one of the traditional factors of economic growth.

However, the fact that entrepreneurship can be influenced by some of the traditional factors of economic growth does not necessarily rule it out as a separate predictor of economic growth. If there is even one factor influencing entrepreneurship not included among the traditional factors of economic growth and entrepreneurship does have an effect on economic growth, then entrepreneurship should be regarded as an additional separate factor of economic growth. The reason for this is that, if entrepreneurship is affected by one or more factors apart from the traditional factors of economic growth and entrepreneurship has an effect on economic growth, then entrepreneurship is essentially acting as a proxy for these other factors. Including entrepreneurship as an independent factor of economic growth would thus ensure that the influence of these other factors on economic growth was at least partly taken into account. There have been many theories which suggest that entrepreneurship is indeed influenced by factors beyond those traditionally thought to influence economic growth.

One of these theories can be found in the ideas of Joseph Schumpeter. In his work *The Theory of Economic Development*, Schumpeter first says that entrepreneurship causes economic growth by allowing the means of production in a society to be used in newer and more efficient combinations (Schumpeter, p. 74). Schumpeter thus claims that it is entrepreneurship (not merely knowledge) which causes technological innovation. He then argues that entrepreneurship is a process that is entirely distinct from the rational economic behavior of people, not a natural result of it. His reasoning is that, for people to behave in an economically rational manner, they must have some amount of knowledge on which to base their decisions. He also states that since people typically draw their knowledge from their past experience, all their rational economic behavior will be based on past ideas and events. According to Schumpeter, then, economically rational behavior is by definition not innovative. As a result of this, rational economic behavior cannot result in the creation of entirely new and untried

combinations of the means of production, the major component of entrepreneurship (Schumpeter, pp. 79-81). Thus, rational economic behavior would simply cause people to adapt to any changes in the levels of these traditional factors in whatever way had proven to be most efficient in the past. Therefore, entrepreneurship, requiring innovation, cannot be a natural result of just the traditional factors of economic growth.

A more recent argument for treating entrepreneurship as an independent factor of economic growth can be found in the article "Entrepreneurship and Regional Growth: An Evolutionary Perspective" by Max Kielbach and David Audretsch. The authors of this article examine the exact nature of the relationship between knowledge and economic growth. They argue that a distinction should be made between the general body of publicly available knowledge and economic knowledge – a subset of knowledge from the general body which businesses have found a way to use profitably. Kielbach and Audretsch go on to say that general knowledge is converted into economic knowledge by the efforts of entrepreneurs, who essentially sift through the general body of knowledge until they find a portion they believe they can exploit and then start a business based on that piece of knowledge. This sifting through the general body of knowledge can be viewed as a process of innovation. It is this economic knowledge that drives economic growth (Kielbach and Audretsch, pp. 606-607). Thus, according to this article, knowledge by itself is not enough to create economic growth since entrepreneurship is required to turn general knowledge into economic knowledge. This runs counter to the argument that entrepreneurship is simply a natural result of high levels of labor, capital, and knowledge.

Kielbach and Audretsch's theory is supported by the findings of C. Mirjam van Praag and Peter H. Versloot in their article "What is the Value of Entrepreneurship? A Review of Relevant Research." In this article, van Praag and Versloot find that countries with a higher level of entrepreneurship also have higher levels of innovation and technological change (p. 395). This is exactly what one would expect to find if Kielbach and Audretsch's theory that entrepreneurship is necessary for turning general knowledge into economic knowledge (and thus innovation) is true.

This theory is similar to that found in the article "The Alert and Creative Entrepreneur: A Clarification" by Israel Kirzner. In his article, Kirzner argues that the main driving force behind entrepreneurship is people noticing and taking advantage of previously unrecognized price differentials (Kirzner, p. 147). Examples of this might include someone realizing that they could use an existing but little-known technique to produce and sell a given good much more cheaply than anyone else, or someone purchasing goods to be sold at a higher price in the future (Kirzner, pp. 147-148). It is this recognition and exploitation of price differentials which moves markets toward equilibrium (Kirzner, p. 147). This is a

direct contradiction to the Schumpeterian idea that entrepreneurship inevitably disrupts the equilibria of markets (Kirzner, pp. 147-148). This contradiction is, however, not important to the thesis of this paper because both Schumpeter and Kirzner agree that entrepreneurship is not solely influenced by the traditional factors of economic growth.

Although they may disagree about the exact nature of the opportunities for profit confronting the potential entrepreneur, Kielbach, Audretsch, and Kirzner all agree that entrepreneurship is caused by the ability of people to perceive and act on these opportunities innovatively. If this idea is correct, then the level of entrepreneurship in a given society is caused by both the extent to which individuals in that society discern and utilize previously undetected opportunities for profit and the levels of some of the traditional factors of economic growth present in that society.

Robert Bednarzick also presents an argument that entrepreneurship is not solely a result of the traditional factors of economic growth. In his article "The Role of Entrepreneurship in U.S. and European Job Growth," Bednarzick identifies seven main factors that influence entrepreneurship in a given country: the opportunities for entrepreneurship present, the demographics, the level of education, the entrepreneurial capacity, the infrastructure, the extent to which culture encourages entrepreneurship, and whether or not capital is controlled chiefly by banks or public markets (Bednarzick, pp. 14-15). Bednarzick also argues that there is a positive relationship between entrepreneurship and economic growth (Bednarzick, p. 14).

Of the seven factors that Bednarzick lists in his article, only the first three can be seen as being significantly influenced by the levels of the traditional factors of economic growth in a given country. The entrepreneurial opportunities present in a given country would be affected by how pro-market the government policies of that country were. Similarly, the level of education in a country would obviously be related to the level of knowledge in that country, and the size of the labor force would clearly be influenced by the population demographics of that country.

However, it is difficult to see how any of the other factors that Bednarzick lists could be significantly influenced by the traditional factors of economic growth. The infrastructure of a given country would be most influenced by government spending (not market-friendly government policy and regulation), and the extent to which a country's culture encourages entrepreneurship is most likely influenced by sociological factors. Entrepreneurial capacity is typically regarded as an exogenous variable whose causes are unclear (Otani, p. 273). Whether capital is controlled chiefly by public markets or banks depends on the general economic structure of a given society, not the traditional factors of economic growth. This suggests that, although the traditional factors of economic

growth will influence the level of entrepreneurship in a given country to some extent, they do not influence it enough to justify its exclusion from the neoclassical model of economic growth.

More direct support for the view taken by this paper is found in the article "Nondestructive Creation: Entrepreneurship and Management Research in the Study of Growth" by R.G. Hubbard. In this article, Hubbard attributes the high economic growth in the U.S. in the 1990's and early 2000's to a combination of high levels of entrepreneurship and managers at companies being able to adapt to changing business conditions (Hubbard, p. 597). He emphasizes that this high level of economic growth can not be solely attributed to increases in labor, capital, or the level of technology present in the U.S., pointing out that the level of technology in several European and Asian countries exceeded that of the U.S. during this period and that productivity in the U.S. stayed high even when it fell in many other countries in the early 2000's (Hubbard, p. 596). Making the assumption that the level of technological sophistication in a given country corresponds roughly to the general level of knowledge in that country, then Hubbard's argument suggests that at least three of the four traditional factors of economic growth do not have a major effect on entrepreneurship. Hubbard's analysis of U.S. economic growth during this period strongly suggests that some measure of entrepreneurship should be included as an independent factor of economic growth.

Methods

Overview of Collected Data and Variables

The position of entrepreneurship in the context of economic growth is investigated using a cross-sectional data set for the year 2005 containing data for 77 different countries. All continents except Australia and Antarctica are represented. The year 2005 was chosen as the most recent year with sufficient data on entrepreneurship available. Countries were included on the basis of availability of data on their level of entrepreneurship in the year 2005. The resulting set of countries nonetheless constitutes a representative sample because of the wide variety of countries included in this data set. A panel data set (including data from multiple years) was not available because there was very little time series data available for the variable measuring entrepreneurship. A complete list of the selected countries is provided in the appendix. All the data is drawn from the World Bank's online World Development Indicators database (World Bank Group).

Six different economic factors are examined in the statistical analysis. These factors will be represented by seven different variables. Five different interaction variables are also used in the statistical analysis. The seven different variables are intended to measure the levels of labor, capital, education, research

and development spending, economic growth, entrepreneurship, and pro-business government policies in a given country. All these are continuous random variables except for the variable measuring pro-market government policies, which is a discrete random variable. Descriptions of these variables and explanations of why they were chosen follow. Table 1 shows the name of each variable, the variable label used in the model equations, and which economic factor the variable is intended to measure.

Table 1. Summary of variables.

Variable Name	Variable Label	Factor Being Measured
gross national income per capita, (purchasing power parity as measured in current international dollars)	GNI	Economic growth
business entry rate	Bentry	entrepreneurship
percentage of the population in the labor force	Labor	labor
Per capita gross capital formation (constant 2000 U.S. dollars)	percapitacap	capital
research and development spending (percent of GDP)	Rdspend	knowledge
Sum of per student expenditures for primary, secondary, and tertiary education (percent of per capita GDP)	Sumedu	knowledge
Ease of Doing Business Index rating	Bease	Pro-market government policies

The variable used to measure economic growth is per capita gross national income, measured in current international dollars using the purchasing power parity technique. GNI is a widely used measurement of economic growth because it is usually seen as a good overall summary of how well-off the residents of a given country are (Todaro and Smith, pp.45-46). The purchasing power parity technique is used to avoid any distortions caused by the official exchange rates of different countries (Todaro and Smith, p.46).

Business entry rate (the World Bank's terminology for this variable) estimates the level of entrepreneurship in a country. This variable provides newly registered businesses as a percentage of the total registered businesses in a given country for a given year. This is in line with other studies examining

entrepreneurship by using business start-up rates as an approximation for the level of entrepreneurship in a given area (Audretsch and Kielbach, p. 609). Dividing by the total number of registered businesses allows direct comparison between countries with economies of different sizes. Although this measure does not take non-profit entrepreneurs into account, it is held to be a good indicator of the level of entrepreneurship in a given country.

The variables reflecting the amounts of labor and capital in a given country are the percentage of the population that is in the labor force and the per capita gross capital formation. Gross capital formation per capita is measured in constant 2000 U.S. dollars, again to reduce any distortionary effects of exchange rates.

There are two main factors which influence the level of knowledge a country has: the size of the general body of knowledge and the level of education. A larger general body of knowledge will contain more economically useful pieces of knowledge, and a
higher level of education in a country gives more people the ability to find the economically useful pieces of knowledge. Consequently, one variable is used to estimate the level of general knowledge in a country and another to estimate the number of people who are able to use that general knowledge. Both contribute to the level of knowledge in a country.

Since the point of research is to create new knowledge, research is the most effective way to expand the general knowledge base. Thus, using research and development spending as a percentage of GDP is used to estimate the level of general knowledge in a country. This measurement includes both private and government research and development spending. A possible objection to using research and development spending as an estimate for how much general knowledge is available in a country might be that general knowledge is not limited by geographic distance. This would mean that once a piece of new knowledge has been generated by research it becomes available to people all over the world, not just to those people in the country that did the research. A country could thus have virtually no research and development spending but still have access to a large general body of knowledge, assuming other countries did have high levels of research and development spending. However, a study by David Audretsch and Erik Lehmann found that new businesses based on a new piece of knowledge tend to be clustered around the source of the new knowledge (Audretsch and Lehmann, p. 1200). If the transmission of new knowledge were not limited by geographical distance then there would be little reason for these new firms to stay close to the original source of the knowledge. This indicates that geographic distance does, in fact, limit the spread of new knowledge. However, there are two other issues with using research and development spending as a measure of the general level of knowledge in a country which cannot be

addressed as easily. The first of these is that official R&D expenditures would not include any general knowledge available only in underground markets. Of course, the underground entrepreneurs who make use of such knowledge would most likely not be included in the official measure of business entry rate. Thus, while important to keep in mind, this should not unduly influence the results of the regressions described below. The other issue is that in some cases the knowledge generated by private R&D expenditures may be held as proprietary information and thus not available to the general public. This implies that private R&D expenditures would have a weaker impact on the knowledge bases of countries than public R&D spending. However, this effect is mitigated by the fact that the analysis presented here considers total R&D expenditures (i.e. the sum of public and private R&D). To estimate the level of education in a country, the sum of per student expenditures for primary, secondary, and tertiary education (as a percentage of per capita GDP) is used.

A country's rating on the World Bank's Ease of Doing Business Index is used to reflect how pro-market the governmental policies in a given country are. This index ranges from 1 to 175, with 1 indicating the governmental regulations most conducive to doing business. It is important to note that this variable only measures how conducive the government policies in a given country are to doing business, not how easy it is to actually do business in that country at any given time. For example, a country in the middle of a major economic depression might still receive a favorable Ease of Doing Business rating if that country's government does not excessively regulate the private sector during the depression.

The interaction variables will consist of labor, percapitacap, rdspend, sumedu, and bease each being multiplied by bentry. Their labels consist of the names of the two variables which are multiplied together, separated by an asterisk. The motivation behind checking for these interaction effects is to ascertain whether any of these variables would have a greater impact on a country's economic growth if a higher level of entrepreneurship were also present in that country. For instance, having a large labor force would contribute greatly to economic growth if a country had a high business entry rate, since there would be more jobs available and the country would thus have many productive workers. However, if the same country had a low business entry rate, a large labor force could be much less productive since many of its members would be unemployed.

Statistical Methodology

The relative importance of entrepreneurship to economic growth is examined by regressing GNI against bentry, bease, labor, percapitacap, sumedu, and rdspend. This regression explores the relationship between economic growth and the set of individual predictors. The equation for this regression is given below.

Equation for GNI regression

$$GNI = \beta_0 + \beta_1 BENTRY + \beta_2 BEASE + \beta_3 LABOR + \beta_4 PERCAPITACAP + \beta_5 RDSPEND + \beta_6 SUMEDU + \varepsilon_0$$

[1]

To examine the extent to which entrepreneurship is determined by the traditional factors of economic growth, bentry is regressed against bease, labor, percapitacap, sumedu, and rdspend. If entrepreneurship is simply a result of the established factors of economic growth, then a large amount of the variation in entrepreneurship should be explained by this regression. The equation for this regression is given below.

Equation for bentry regression

$$BENTRY = \beta_0 + \beta_1 BEASE + \beta_2 LABOR + \beta_3 PERCAPITACAP + \beta_4 RDSPEND + \beta_5 SUMEDU + \varepsilon_0$$

[2]

Since bentry is a percentage with limits of 0 and 100, it is possible that some of the predicted results of an OLS regression with bentry as the dependent variable would be logically impossible, either by being greater than one hundred percent or negative. To check whether or not this is actually the case, a Tobit regression using the same dependent and explanatory variables presented in equation [2] will be run. If this regression differs from the OLS regression for bentry, then it will be used instead of the OLS regression.

To determine whether or not there are any interaction effects between bentry and the traditional factors of economic growth, each of the five interaction variables will be separately included in regressions which will otherwise be the same as the regression for equation [1]. The interaction variables will not all be included in the same regression to avoid multicollinearity. A generic equation for all these regressions is given below, in which i refers to the interaction variable present in a given regression.

Equation for GNI regression with interaction variable included

$$GNI = \beta_0 + \beta_1 bentry + \beta_2 bease + \beta_3 labor + \beta_4 percapitacap + \beta_5 rdspend + \beta_6 sumedu + \beta_7 i + \varepsilon_0$$

[3]

Presentation and Analysis of Empirical Results

The regression for gross national income in equation [1] has an overall R-squared value of 0.9167, indicating that the explanatory variables in the model explain 91.67% of the variation in gross national income. The coefficients and p-

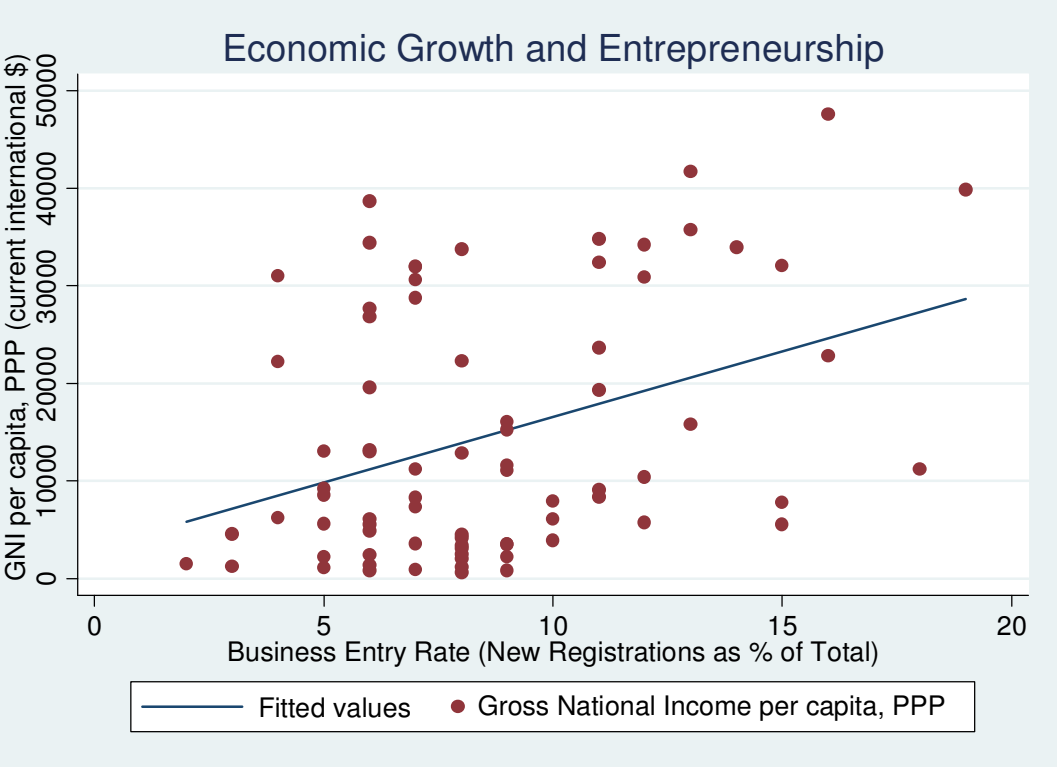
values of the regressor variables are summarized in Table 2. Significantly, the regression gives 574.5997 as the coefficient for business entry and .05 as its p-value. This indicates that there is a significant, positive linear relationship between business entry rate and gross national income, and consequently between entrepreneurship and economic growth. Capital, as denoted by percapitacap, has a very low p-value, indicating that the level of capital in a given country has a large amount of influence on the economic growth of that country. None of the other predictor variables had a significant p-value.

Table 2. Results from regression equation [1].

Variable Name	Coefficient	P-value
bentry	574.5997	0.05
bease	-.9768352	0.971
sumedu	-5.394058	0.557
percapitacap	3.574365	0.000
labor	-88.67919	0.497
rdspend	1856.359	0.155

The graph plotting bentry against GNI is given below. This graph illustrates the trend of increasing business entry rate leading to a higher level of GNI per capita. This supports the view that there is a positive relationship between the business entry rate of a country and its level of gross national income.

Figure 1. Graph of bentry plotted against GNI



The OLS regression of bentry versus the traditional economic indicators (equation [2]) has an R-squared value of 0.3890, indicating that only 38.90% of the variation in business entry rate is explained. The regression is summarized in Table 3. Only one of the explanatory variables (bease) is shown to be significant at the five percent level. The low R-squared value indicates that, although bease does influence bentry, it is by no means enough to explain all of the variation in bentry. It is important to remember that the coefficient for bease is negative because lower values of bease indicate more conducive government policies towards starting businesses. It is thus reasonable to conclude that the level of entrepreneurship in a given country is not only a result of the levels of the traditional factors of economic growth in that country.

Table 3. Results from regression equation [2].

Variable Name	Coefficient	P-value
bease	-0.0435234	0.018
sumedu	-0.003947	0.556
percapitacap	0.0002953	0.403
labor	0.0963573	0.307

rdspend	-1.553725	0.088

The Tobit regression for business entry rate produced essentially the same results as its OLS counterpart. Figure 1 shows bentry values are low, though not approaching 0 and well below 100. The OLS regression should thus yield unbiased results.

The interactions of other factors with bentry were investigated by separately including each interaction in the regression for economic growth, as shown in equation [3]. The only interaction term which was found to be significant (with a p-value of 0.049 and a positive coefficient) was the term bentry*rdspend. This indicates that there is a strong and positive interaction effect between the level of entrepreneurship in a given society and the amount of research and development spending in that society. Thus, a country with both a high level of R&D spending and a high business entry rate will experience additional economic growth from this combination beyond the growth generated by each of the individual variables. Interestingly, in the regression using bentry*rdspend, bentry itself was insignificant with a p-value of 0.550. This indicates that there may be some collinearity between bentry and bentry*rdspend in the regression. Van Praag and Versloot found that countries with a higher level of entrepreneurship also have higher levels of innovation and technological change (van Praag and Versloot, p. 395). The interaction terms and their p-values are given below in Table 4. The high p-values of the interaction terms apart from bentry*rdspend indicate that there are most likely no interaction effects between bentry and any of the other variables. Thus, countries with a high business entry rate and high values for any of the variables apart from rdspend will not experience any effects on economic growth resulting from this combination beyond what the individual variables contribute.

Table 4. Results from separately including interaction effects with bentry in regression equation [1].

Interaction Variable Name	P-value	Coefficient
bentry*bease	0.778	-1.790503
bentry*labor	0.178	61.81535
bentry*percapitacap	0.214	0.1044403
bentry*sumedu	0.838	0.7863554
bentry*rdspend	0.049	527.0134

Conclusion and Possible Directions for Future Research

The results from regression equation [1] confirm that entrepreneurship has a significant impact on economic growth as has been generally established. The

regression for business entry rate (equation [2]) shows that the presence of entrepreneurship in a society cannot be completely explained by the traditional neoclassical factors that influence economic growth. Consequently, entrepreneurship should be included as an independent factor in the neoclassical model for economic growth. One of the themes in this paper has been that entrepreneurship causes economic growth by fostering innovation within a given society. Interestingly, the only factor significantly interacting with entrepreneurship was research and development spending, itself reflective of innovation (van Praag and Versloot, p. 354). It should be noted, however, that R&D spending is not a perfect indicator of the level of innovation in a society. For instance, a simple measure of R&D spending makes no allowance for how innovative a given research project is (e.g., if the research project focuses on entirely new technology or on simply making minor improvements to existing technology). Indeed, it is difficult to conceive of any quantifiable way in which innovation would be measured with complete accuracy.

Nevertheless, these results are important for policy makers because they indicate that a country should devote at least some of its resources towards promoting entrepreneurship directly instead of focusing solely on the more traditional factors of economic growth. For this to happen, causal factors for the significant amount of the variation in entrepreneurship left unexplained in regression equation [2] must be discovered. This is an important question to be answered by future research. However, any researchers attempting to answer this question may be confronted by a serious problem. This is that some of the factors which encourage entrepreneurship might be unquantifiable. For instance, in his article "The Alert and Creative Entrepreneur: A Clarification," Israel Kirzner distinguishes his theory of entrepreneurship from Joseph Schumpeter's by saying that in his theory entrepreneurship is determined by how alert people are to opportunities for making a profit by taking advantage of price differentials, while in Schumpeter's theory entrepreneurship is determined by how innovative people are in creating new technology (147-148). Thus, if either Schumpeter's or Kirzner's theory is correct, then entrepreneurship would be determined by a factor which is extremely difficult to quantify.

In this case, the best course for future research into this problem might be attempting to verify which quantifiable variables (if any) affect entrepreneurship. While clearly not an ideal solution, this approach would at least shed some light on the causes of entrepreneurship. Barring the discovery of ways to reliably quantify and aggregate variables such as an individual's creativity or alertness, this may be the best alternative. Since some of the possible causes of entrepreneurship revolve around psychological or cultural qualities such as creativity or alertness to opportunities for profit, it might be necessary to engage in cross-disciplinary research between economics and psychology or sociology.

For instance, psychological and sociological theories could be examined for quantifiable indicators of the level of creativity present in a given society, which could then be used to help predict entrepreneurship.

Another possible topic for future research might be a more in-depth analysis of the interaction effect this paper uncovered between entrepreneurship and research and development spending. Specifically, a good question is whether research and development spending by government agencies has a different interaction effect with entrepreneurship than research and development spending by private entities. This question might have important implications for policy makers in countries which already have a relatively high level of entrepreneurship.

The idea that entrepreneurship and economic growth are positively related has a broad base of support, both in terms of theory and empirical evidence. The exact causes of entrepreneurship, however, are more difficult to definitively identify. This paper has demonstrated the impact these unknown causes have on the economic growth of nations. Until these causes are discovered, it will be necessary to use entrepreneurship as a gauge for measuring their impact on economic growth.

Appendix

List of countries represented in data set

Albania
Algeria
Argentina
Armenia
Austria
Bangladesh
Belgium
Bolivia
Bosnia and Herzegovina
Botswana
Canada
Chile
Colombia
Congo, Rep.
Costa rica
Croatia
Cyprus
Czech Republic
Denmark
Egypt, Arab Rep.
Estonia
Finland
France
Georgia
Greece
Guatemala
Haiti
Honr Kong, China
Hungary
Iceland
India
Indonesia
Ireland
Israel
Italy
Japan

Jordan
Kazakhstan
Kenya
Latvia
Lebanon
Lithuania
Macedonia, FYR
Madagascar
Malawi
Malta
Mexico
Moldova
Morocco
Netherlands
New Zealand
Norway
Pakistan
Peru
Poland
Romania
Russian Federation
Senegal
Serbia
Singapore
Slovak Republic
Slovenia
South Africa
Spain
Sri Lanka
Sweden
Switzerland
Syrian Arab republic
Tanzania
Tunisia
Turkey
Uganda
Ukraine
United Kingdom
Unitied States
Yemen, Rep.
Zambia

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