Institutions, Entrepreneurship, and Regional Differences in Economic Growth

Joshua C. Hall
Assistant Professor of Economics
Department of Economics & Management
Beloit College

Russell S. Sobel
James Clark Coffman Distinguished Chair in Entrepreneurial Studies
Department of Economics
West Virginia University

ABSTRACT

This paper takes an institutional approach to explaining differences in the levels of entrepreneurship and economic growth across U.S. states. The institutional approach to growth argues that political and economic institutions influence the productivity of resource use. We hypothesize that institutions influence economic growth primarily through their effect on entrepreneurship and discovery. In this paper, we test the hypothesis that institutional quality is a determinant of regional differences in entrepreneurship and economic growth using data from the *Economic Freedom of North America* index to measure institutional quality.

Keywords: innovation, economic freedom, entrepreneurship

JEL Code: M130, 0180, R110

Introduction

The question of why some areas are rich and some are poor has been at the center of economics since Adam Smith ([1776] 1998) first published his Inquiry into the Nature and Causes of the Wealth of Nations. In his analysis, Smith focused the division of labor and how the division of labor was limited by the size (or 'extent' as he termed it) of the market. Larger markets lead to an increase in the division of labor and thus higher productivity. Higher productivity, in turn, leads to economic progress directly by increasing wages and indirectly through freeing up scarce resources for other uses.

Ricardo (1817), however, focused attention back on the role that inputs such as land, labor, and capital played in economic growth. The creation of macroeconomic statistics in the early twentieth century led economists to focus on aggregate theories of growth that could explain this newly developed macroeconomic data. Solow (1956) developed a simple growth model where economic output was simply a mathematical function of capital and labor inputs [$Y = f(K,L)$] based on neoclassical theory that, when tested empirically, fit the available U.S. data quite well. The Solow model was the dominant theory of economic growth from the time of its creation until the 1980s and is still heavily used in many graduate macroeconomics classes. While this model has been augmented to sometimes include measures of technology and human capital quality, it fundamentally ignores the institutional arguments made by Adam Smith. In the Solow growth model, these complex institutional structures are simply represented by the functional form of the model, $f(\cdot)$.

During the 1980s new data sets were created that contained macroeconomic data on a large number of countries over an extended period of time (see, for example, Summers and Heston (1991)). The creation of these data sets allowed economists for the first time to test whether per-capita incomes across countries were converging to equality—a key prediction of the neoclassical growth model (Romer, 1994). Subsequent research on the question of convergence has shown that there is no clear

tendency for poor regions to grow faster than wealthier regions (Romer, 1994) although some research does show that regions within a country do converge, albeit slowly (Barro and Sala-i-Martin, 1992; Holtz-Eakin, 1993). At best, convergence is a slow and discontinuous process (Martin and Sunley, 1998). The finding that convergence sometimes happens slowly within a country (or a set of similar countries) has led to the idea of conditional convergence, where convergence happens conditional on regions having similar properties.

The failure to find convergence in cross-country regressions was problematic since the Solow model was the model of economic growth at the time and had a strong influence on public policy. It could not, however, explain key features of the real world, such as persistent differences in income levels across countries. Neoclassical growth theory could also not explain the relationship between entrepreneurship and economic growth since the level of innovation was determined exogenous to the system. Even models like Barro and Sala-i-Martin's (1992) that relax the neoclassical assumption of uniform technology across space have no explanation for why technological innovation might vary from place to place. Out of this disenchantment came endogenous growth theory, which relaxed the neoclassical assumption of exogenous technological change and the non-excludability of technology.

Unfortunately, endogenous growth theory cannot explain divergent levels of income across countries or the rapid development of countries like South Korea (Parente, 2001). From the standpoint of public policy, the failure of endogenous growth models to provide an explanation for varying levels of economic development is troubling because the sources of growth in endogenous growth models (such as the percentage of GDP spent on research and development) may not be the route to development. While endogenous growth models make innovation endogenous they say little about how and why firms and individuals appear to generate, absorb, and apply innovations at different rates across regions even holding constant investment in research and development (Martin and Sunley, 1998).

The omission of entrepreneurship and discovery from the standard models of economics is widely recognized, and we argue that its omission from growth theory is even more critical. Missing from the endogenous growth literature is why the ability of individuals and firms to adapt and innovate varies across space. In other words, what changes across space that causes the ability of individuals to learn and innovate in a socially-productive manner? This study takes an institutional approach to explaining differences in entrepreneurship and income levels and growth rates across regions. We argue that what is missing in the endogenous growth literature is a focus on how economic institutions affect entrepreneurship and innovation within a society. In doing so, we open up the 'black box' of innovation to explain why some societies are able to generate increasing returns given certain inputs and others cannot. Our contention is that only by explaining why innovation and entrepreneurship vary across space can we understand why regions have persistent differences in income and growth, and why convergence does not occur as the standard growth models predict. Institutional path-dependence and the difficult process of institutional change help to explain the persistence of regional differences in income and growth.

In this paper, we discuss the critical role of institutions for economic growth and postulate that the key linkage between the two occurs through entrepreneurship. We review the empirical evidence on this issue, and provide new evidence from the latest index of entrepreneurial activity for the U.S. states, the Kauffman Index of Entrepreneurial Activity (KIEA) (Fairlie, 2006a). Specifically, we use the Economic Freedom of North America (EFNA) index (Karabegovic and McMahon, 2006) as a measure of institutional quality to examine the effect of institutions on cross-state differences in entrepreneurship, income, and economic growth. The results presented here confirm that institutions consistent with free-market capitalism, or 'economic freedom,' lead to higher levels of productive entrepreneurial activity, which in turn generate higher per capita income levels and higher rates of economic growth. This finding is important because, in contrast to traditional growth models, it suggests that places with better

institutional structures will be richer and grow faster, creating a widening gap between rich and poor areas.

The remainder of the paper proceeds as follows. The next section places the neoclassical/endogenous growth debate in the context of the regional economic development literature. In section 3 we explain the institutional approach to growth and describe the role of the entrepreneur in translating good institutions into economic development. Section 4 describes our data while Section 5 presents our empirical results. Our final section concludes with discussion of the results and some thoughts on the future of research into institutions, entrepreneurship and economic growth.

Two Theories of Regional Economic Growth

In recent years, the economics literature has offered two different perspectives on divergent levels of growth across regions. The first perspective on regional economic growth is rooted in mainstream neoclassical equilibrium and is best identified in the regional literature with the work of Borts (1960) and Borts and Stein (1964). The second perspective takes a disequilibrium approach and is based on the work of Kaldor (1970). Within the literature the presumption is that these two are distinct. Here we argue that the disequilibrium perspective is correct but that it is important not to ignore some of the insights of the neoclassical model.

The neoclassical perspective on long-run economic development is driven by its focus on equilibrium. Regional differences in factors such as wages, prices, or the return to capital, from a neoclassical perspective, represent disequilibrium. In the long run, these regional differences should largely disappear as the mobility of labor and capital bring about the elimination of regional differences in income. In the long run, for example, labor in low-wage regions should flow to high-wage regions resulting in falling wages in high-wage regions and the raising of wages in low-wage regions. Capital, on the other hand, should be observed flowing from high-wage regions to low-wage regions. Thus, the

neoclassical model predicts that in the long run, if key resources are mobile, regional incomes should converge.

However, human activity is not uniform across space. Native factors such as topography and natural resource endowments play a large role in the concentration of individuals and resources (Cushing, 1987). The city of Pittsburgh, for example, came into existence because of its proximity to three major waterways. Ellison and Glaeser (1999) point out how the concentration of the U.S. wine industry in California is due to climatic factors that give the region a natural cost advantage. The same is true of industries based on natural resource endowments, such as the coal industry in West Virginia. While natural resource endowments can in part determine the growth path of an economy if the incentive to invest in research and development is reduced because of the presence of endowments, the ability to trade for new technology means that consumption is almost certainly higher because of the endowments than it would be without (Grossman and Helpman, 1994). Fixed factors thus contribute to regional divergence through their effects on agglomeration and investment in innovation.

Even without geographically unique endowments, however, individuals have an incentive to concentrate in cities and regions to take advantage of the benefits from the agglomeration of individuals in space (Mulligan, 1984). There are three sources of external economies of scale that create agglomeration. The first force promoting geographic concentration is the backward and forward linkages that occur in large markets. Local production of intermediate goods lowers production costs for firms and the closeness of consumers lowers shipping costs. Second, the thick labor markets created by the large number of geographically concentrated individuals are beneficial both to firms and workers. Firms benefit from having easy access to employees with specialized skill and employees find it easier to find employment. The third force promoting concentration is the effect of pure external economies of scale—knowledge spillovers. The confluence of individuals into a small geographic space makes the

diffusion of innovation almost costless and increases the opportunity for innovation as individuals are exposed to different industries. Krugman (1998) calls these forces 'centripetal forces' because they are the three forces that promote geographic concentration.

Just as there are forces promoting the clustering of individuals and firms in space, there are forces pushing them apart. Krugman (1998) terms these 'centrifugal forces' and gives three main types. First, immobile factors such as natural resources endowments prevent extreme agglomeration since firms and workers must locate in close proximity to the endowments. Second, the geographic concentration of individuals in space drives up the demand for land in large markets, increasing land rents and discouraging further migration to the area on the margin. Third, an increasing concentration of individuals in a geographic area can lead to pure external diseconomies of scale such as air pollution or congestion. All three of these factors mitigate, to some extent, the centripetal forces mentioned earlier.

The presence of immobile factors and centripetal forces is important because they provide a strong case why we might not see a convergence in incomes and wealth across space as predicted by the neoclassical model. If the concentration of individuals into cities generates pure external economies of scale that are not completely offset by pure diseconomies of scale, densely-populated areas should have higher incomes than sparsely-populated areas other things being equal. Or if there are location-specific amenities valued by households, some areas may retain high wages to compensate households for the lack of location-specific amenities such as in the models of Mueser and Graves (1995). History, geography, and luck all point towards there being some level of divergence in incomes across space that is persistent.

That does not imply that we should not observe some convergence across regions. The equilibrium forces at work in the neoclassical model are still present in the disequilibrium model and

thus we should see some convergence over time as knowledge becomes diffused over space. At the same time, however, the urbanization economies at work in high-income regions beget more entrepreneurship and innovation, spurring high-income areas ahead until knowledge can diffuse and factors become mobile. Here we are arguing that the innovation caused by urbanization economies causes a divergence-convergence cycle. A new innovation happens because of urbanization economies giving some initial benefit to the urban area. Over time, those innovations become diffused over space and the centrifugal forces such as higher land rents lead to convergence. This argument is consistent with the empirical literature on convergence showing that convergence is a discontinuous process filled with starts and stops. A discontinuous process of convergence is consistent with the chaotic and random process of entrepreneurship and innovation occurring more frequently in highly agglomerated areas.

Institutions, Entrepreneurship, and Economic Growth

Having established that uninterrupted market forces can cause divergence in growth and incomes across regions, we now turn our attention to the role of institutions. According to North (1991, 97), "Institutions are the humanly devised constraints that structure political, economic, and social interaction." Institutions can be either formal, as in the U.S. Constitution, or informal, as in customs or beliefs. Individuals find it necessary to devise institutions to set constraints on market interaction in order to maximize the gains from exchange. Market transactions and exchange depend on cooperation and trust, which is lacking in one-shot settings or in cases of asymmetrical or incomplete information. In these cases the transactions costs to widespread exchange are high. While exchange is possible, considerable resources are necessary to overcome the lack of trust.

By reducing uncertainty and making clear the rules of the game, institutions lower transactions costs. The lowering of transactions costs not only makes certain exchanges more profitable, but it increases the number of potential exchanges because in the presence of low transactions costs

previously unprofitable exchanges are now profitable. Formal institutions help individuals capture the gains from trade by making it possible for widespread exchange to occur with low transactions costs. For example, knowing that a potential transaction is occurring in a system of well-defined and protected property rights facilitates the type of widespread economic exchange characterized by online auction sites such as eBay. By reducing transactions costs and allowing individuals to capture the gains from exchange, institutions increase the production possibilities of an economy (Boettke and Coyne, 2003). Thus, in contrast to the neoclassical model's prediction, the institutional model's prediction is that two locations with identical geographical features, demographics, and the same level of inputs (or resources) can have wildly different economic outcomes because of different institutional structures.

The economic development literature has recently begun to recognize the importance of institutions. There is a growing theoretical and empirical literature on the importance of institutional quality in explaining cross-country differences in growth (North, 1990; Dawson, 1998; Hall and Jones, 1999; Gwartney, Holcombe and Lawson, 2004). While each of these papers measures institutions in a slightly different way, they all find evidence that countries with better institutions have higher levels and rates of growth than countries with poor economic institutions.

Missing in these papers, however, is the mechanism through which institutions lead to higher economic growth. What is the process through which institutional differences lead to differences in income and growth? For instance, does protection of property rights merely result in fewer resources being devoted to protection from theft? Or does a reduced risk of expropriation create an environment in which positive-sum entrepreneurship flourishes? Or is it some combination of the two? While some studies have tried to parcel out which parts of economic freedom are most important to economic growth (most notably, Heckelman and Stroup (2000)), these studies do not address the mechanism through which institutions lead to economic growth. Instead, they generally try to explain which parts of

economic freedom (such as property rights or legal structure) are most important. How can institutional differences lead to the increasing returns necessary to explain persistent cross-sectional differences in income and growth?

In this paper we propose that institutions lead to entrepreneurship which begets economic growth. Since the quality of institutions differs across regions and is quite persistent over time, this provides an explanation for the discontinuous nature of regional convergence and divergence. Areas with good economic institutions are able to continually 'jump ahead' of places with poor institutions because good institutions lead to entrepreneurship and innovation. Kreft and Sobel (2005) find that states with more economic freedom have higher levels of entrepreneurship and economic growth while Campbell and Rodgers (2007) find a strong positive relationship between economic freedom and net business formation. This research provides the first evidence that the conduit between economic freedom and economic growth is through entrepreneurship and it is this literature that we seek to expand upon.

Our hypothesis brings together three distinct lines of literature into one explanation for regional differences in income and growth. The first explanation, as discussed earlier, is the body of research linking institutions to growth. Second, the endogenous growth literature links innovation to economic growth. Finally, there is a recent body of literature empirically linking entrepreneurship to economic growth (Zacharakis, Bygrave, and Shepherd, 2000; Ovaska and Sobel, 2005; Berkowitz and DeJong, 2005). Our thesis, which brings together these three strains of literature, is that the economic institutions of a region determine, to a large extent, where entrepreneurship and innovation will occur and thus which regions will see strong and persistent bouts of economic growth.

Our argument relies on Baumol's (1990) distinction between 'productive and unproductive entrepreneurship.' Contrary to those who suggest that regional differences in

entrepreneurship can be explained by regional differences in 'entrepreneurial spirit,' Baumol argues that there is little evidence that entrepreneurial spirit differs across regions. Instead, regional differences in entrepreneurship are the result of different institutional arrangements across regions. In regions where payoff to self-employment is high, we should observe more self-employment. In regions where the expected payoff to self-employment is low, perhaps because of taxation, we should observe lower rates of self-employment.

The key insight of Baumol is that entrepreneurial efforts are directed towards the exploitation of all *recognized* profit opportunities. Entrepreneurship is the recognition of a pure profit opportunity that had previously gone unnoticed (Kirzner, 1997). Recognition of profit opportunities is unique to time and space, however, and thus the allocation of talent within a society is important to future innovation because it places individuals into situations with different societal payoffs. In regions with good institutions, creative individuals are more likely to become employed in wealth-creating occupations such as engineering and thus are more likely to engage in wealth-creating entrepreneurship. Conversely, in regions with bad institutions, individuals will be attracted to activities that are personally remunerative but socially destructive such as lobbying and lawsuits. Good institutions help to foster an entrepreneurial climate conducive to innovation and growth.

Data

The measure of institutions we employ in this paper is the Economic Freedom of North America (EFNA) index released annually by the Fraser Institute. The EFNA index measures the extent of the restrictions that governments place on economic freedom within the U.S. states and Canadian provinces. At its core, the EFNA index is supposed to measure the extent to which citizens are free to acquire, use, and dispose of property so long as they do not violate the rights of other individuals (Karabegovic and McMahon, 2006). The three core components of the EFNA index are: size of

government, takings and discriminatory taxation, and labor market freedom. The authors use data from government and non-government sources to assemble the index, which is constructed on a scale of zero to ten with ten being an extremely high level of economic freedom. Since the EFNA index compares states and provinces to one another, it is a relative ranking in that it does note tell how economically 'free' in an absolute sense Wyoming is, but rather how 'free' Wyoming is compared to Connecticut in a given year. The EFNA index is available annually going back to 1980.

The academic literature on institutions and entrepreneurship has used several different measures of entrepreneurship. Kreft and Sobel (2005) look at the impact of economic freedom on the growth rate in sole proprietorships. Ovaska and Sobel (2005) analyze the effect of economic freedom on the growth rate of private enterprises and trademark applications, while Campbell and Rodgers (2007) examine the relationship between state economic freedom and net business formation. Recently, the Kauffman Foundation set out to create a new state-level measure of entrepreneurship, the *Kauffman Index of Entrepreneurial Activity*. The KIEA uses the monthly data files from the Current Population Survey (CPS) to create a longitudinal data set of a representative sample of U.S. adults. From that data set the number of non-business owning adults (ages 20-64) who start a business each year is measured and used to create the index.

The KIEA would appear to have two advantages over previous used measures of entrepreneurship in the literature. The first advantage of the KIEA is that it measures flows into entrepreneurship rather than the stock of entrepreneurship. For example, the number of sole proprietorships within a state is a stock variable and thus reflects past economic activity as well as current conditions. The KIEA index therefore appears to more accurately capture dynamic entrepreneurial activity (Fairlie, 2006b). The second advantage of the KIEA follows from the fact that it is based on the CPS and not derived from business incorporation data or payroll records. Data derived

from records of incorporation or payroll records can often understate entrepreneurial activity, since many business do not incorporate or have zero employees. Including entrepreneurs who have no employees is likely to be most important in measuring entrepreneurship in high-technology areas. The main drawback to the state-level KIEA at this point is that it is only available for the years 2004 and 2005, thus limiting the empirical approach to a cross-sectional analysis.

In addition the KIEA and EFNA index, we also include several other control variables standard in the entrepreneurship literature (see, for example, Bruce (2002)). The percentage of state residents over 25 with at least a bachelor's degree, the median age of the state population, the percentage of state residents that are Hispanic, and the percentage of state residents that are male are included as demographic controls. Socioeconomic controls are the state unemployment rate, state gross domestic product per capita, and population density. A description of these variable and their means and standard deviations are available in Table 1. Most policy variables that are often included in empirical studies of entrepreneurship (such as marginal income tax rates) cannot be included here because they are already included in the EFNA index. The one exception is the homestead exemption from state bankruptcy laws.

Since an entrepreneur's home is in most cases their most valuable asset, the ability of potential entrepreneurs to shield their home and other assets from being liquidated during bankruptcy might affect their propensity to become an entrepreneur (Fan and White, 2003; Garrett and Wall, 2006). The level of exemption varies considerably by state due to state-level differences in how much of the homestead is exempted during bankruptcy. For example, in 1997 six states had no homestead exemption while eight states had an unlimited exemption (Garrett and Wall, 2006). The measure of the size of the homestead exemption we use comes from Garrett and Wall (2006) and measures the percentage of the average homestead in a state that would be protected during a bankruptcy.

Table 1. Summary Statistics

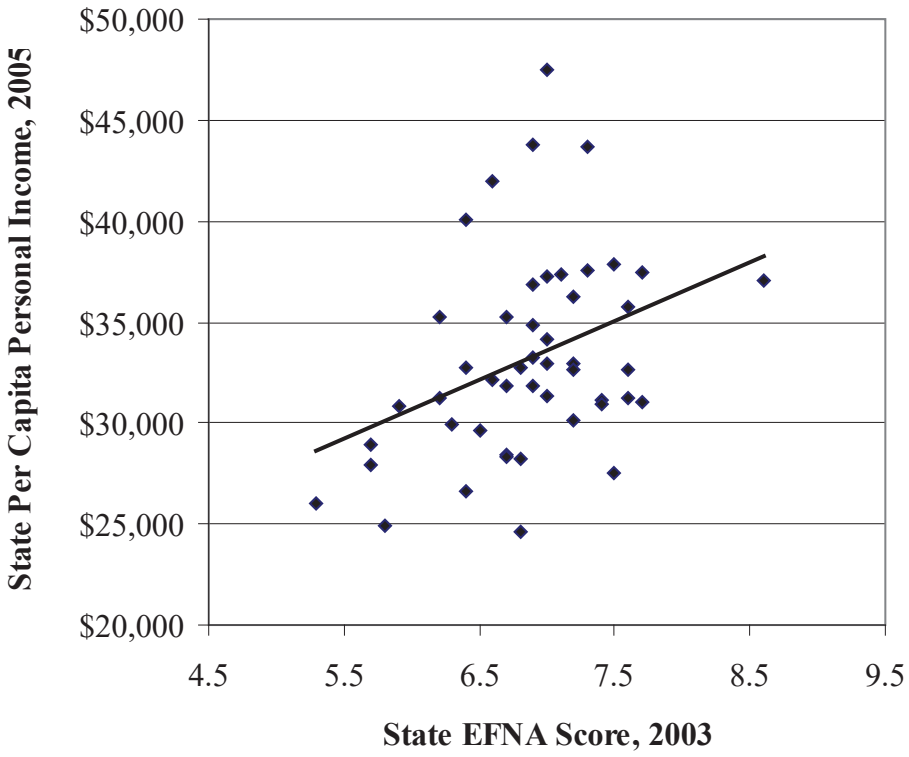
Variable	Mean	Std. Dev.	Min	Max
Kauffman Index of Entr. Activity	-10.8	6.9	-28.0	5.0
Economic Freedom	6.9	0.6	5.3	8.6
% Hispanic	9.1	9.7	0.9	43.4
% College Degree	26.9	5.2	15.1	36.9
Population Density	193.0	261.6	5.2	1175.3
% Male	49.3	0.6	48.3	50.9
Median Age	36.8	2.2	28.5	41.1
Unemployment Rate	4.9	1.0	3.4	7.9
Gross Domestic Product Per Capita	$40,346	$7,184	$27,829	$66,961
Homestead Exemption	29.6	25.3	0.0	75.4
Homestead Exemption Squared	1505.0	1953.4	0.0	5685.2

The relationship between the size of the homestead exemption and entrepreneurship is likely non-linear in nature because the exemption has two different effects. The first, called the *wealth-insurance effect*, is positive because a higher homestead exemption limits the downside risk potential entrepreneurs face. The second effect, called the *credit-access* affect, is negative because banks are aware that their ability to recoup their losses during bankruptcy proceedings is limited by the homestead exemption and therefore limit the amount of credit they offer to fledgling entrepreneurs. To account for these opposing effects, we employ both the homestead exemption measure as well as the homestead exemption squared in the empirical section of the paper.

Empirical Evidence

First, we begin by showing the general relationship between the EFNA index and economic prosperity that has been confirmed by previous research (Kreft and Sobel, 2005; Gwartney, Holcombe and Lawson, 2004). Figure 1 illustrates the basic relationship between a state's EFNA score and the levels of per capita income across the U.S. states. As is clear in the figure, institutional quality is positively correlated with the levels of per capita income. Thus, states with greater economic freedom have higher levels of economic growth.

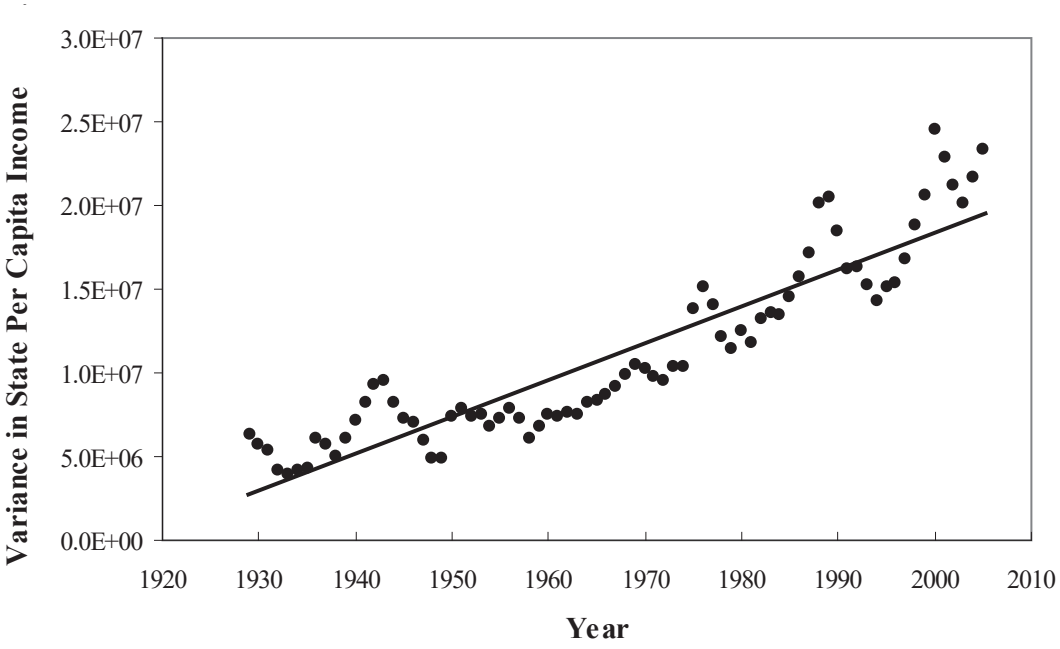
Figure 1. Economic Freedom and Growth



This relationship between economic freedom and the level of prosperity in a state is not by itself contradictory to a finding of convergence. The equilibrium forces at work in the standard convergence model simply suggest that states will converge in income over time. Yet this is not happening. Quite

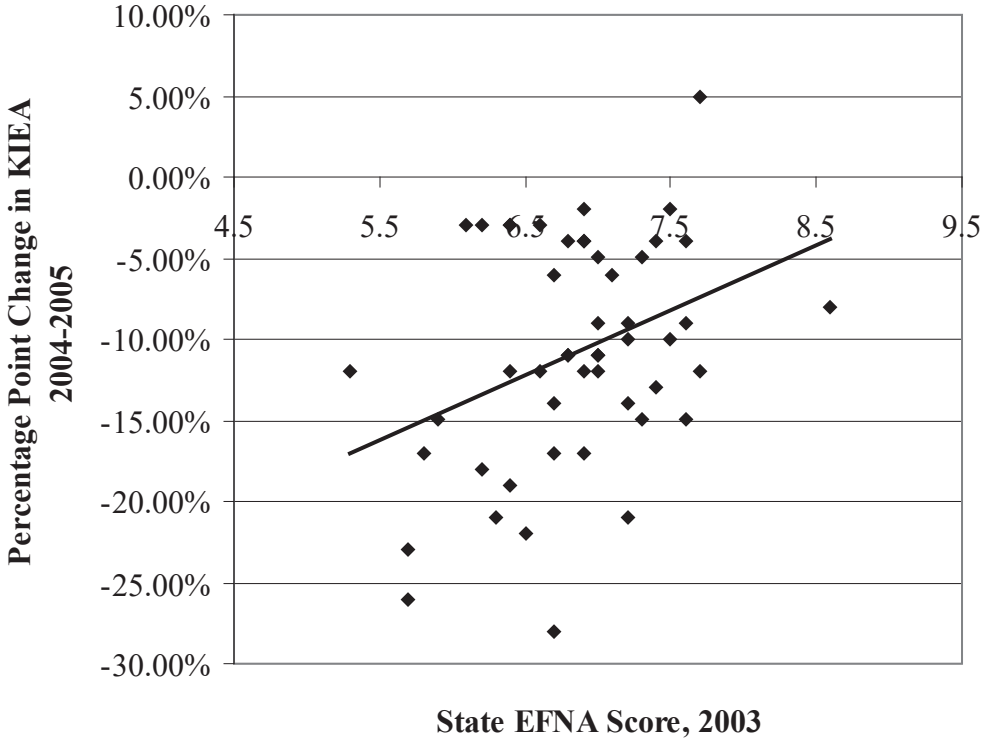
simply put, states such as Delaware are high-income and are growing the fastest, while states like West Virginia are low-income and growing the slowest. Rather than converging, states are moving further apart. This is easiest to see in Figure 2, which shows the variance across states in real per capita personal income for the entire period for which such data exists (1929-2005). While there are cyclical patterns, the overall trend is definitely positive. The variance across states is growing, not shrinking.

Figure 2. The Variance in Real per Capita State Personal Income, 1929-2005



The remaining empirical question is whether there is a link between institutional quality and entrepreneurial activity as has been demonstrated previously by Kreft and Sobel (2005) and Campbell and Rodgers (2007). Figure 3 shows the raw positive correlation between the percentage point change in the KIEA index from 2004-2005 and the level of economic freedom in a state. It is important to note that all states had significant reductions in their scores over this time period, so the mean change is negative. Nonetheless, there is a clear relationship, the places whose scores fell by the most (e.g., those having the largest reductions in entrepreneurial activity) were those with the worst institutional quality.

Figure 3. Economic Freedom and Entrepreneurship



Could there be other factors that differ across states driving the results showing in Figure 3? To answer this question, we estimate an empirical model explaining the change in the KIEA from 2004-2005 using the explanatory variables discussed in the previous section. Table 2 presents our key results. In Column 1, we estimated the empirical model using ordinary least squares (OLS) and employing White's correction for heteroskedasticity. The results in Column 1 confirm that 'economic freedom', as measured by the most-recent EFNA index score for a state, has positive and significant impact on the change in the rate of entrepreneurship as measured by the Kauffman entrepreneurship index. The relationship is statistically significant at the 5 percent level. Calculated at the mean, the coefficient on economic freedom from Table 2 suggests that a one-unit change in the EFNA index would result in a 5.041 unit change in the dependent variable, or almost exactly two-thirds of a standard deviation (6.9).

In Column 2 and 3, we estimate the model using spatial econometric methods. These models are useful in situations where geographic (spatial) dependence exists in the data, which recent research has found to be the case with small business activity (Sobel and Dean, 2006). Spatial dependence exists when there are unobservable geographic correlations within either the dependent variable, or the regression error term, and this can render OLS to be either biased and inconsistent or inefficient. For readers unfamiliar with spatial econometrics, LeSage and Pace (2004) provides an overview. However one may simply think of spatial models as analogous to ARMA time series models, but with the lags occurring over geographic distances, rather than through time. We run both a spatial autoregressive model (SAR) of degree one, analogous to the AR(1) model in time series, and a spatial error model (SEM), analogous to an MA(1) process.

The SAR model has an additional parameter estimate, rho, which is the coefficient on the spatially lagged dependent variable. This variable measures the extent to which entrepreneurship in neighboring states influences entrepreneurship in a particular state. It is insignificant, suggesting that there is no direct spatial dependence. In the SEM model, the additional parameter, lambda, is the coefficient on the spatially lagged error term. It is significant, showing the presence of spatially dependence in the error term and implying that SEM results are likely the most accurate estimates in Table 2. While in the SAR model the coefficient on economic freedom remained significant and of about the same magnitude, in the SEM model correcting for the spatially dependent error structure increases the size of the coefficient on economic freedom.

Table 2. Economic Freedom and Entrepreneurship, Regression Results

Dependent variable: Percentage Point Change in KIEA, 2004-2005

Variable	OLS		SAR		SEM	
Constant	-144.42		-144.76		-251.68	
	(1.05)		(154.47)		(190.44)	
Economic Freedom	5.041	**	5.058	**	5.879	**
	(2.17)		(2.73)		(2.71)	
% Hispanic	-0.026		-0.018		0.009	
	(0.28)		(0.13)		(0.14)	
% College Degree	0.442	*	0.44	*	0.455	**
	(1.89)		(0.26)		(0.26)	
Population Density	0.001		0.001		0.001	
	(0.35)		(0.01)		(0.01)	
% Male	0.821		0.831		2.77	
	(0.32)		(2.80)		(3.52)	
Median Age	1.103	*	1.104	*	1.377	*
	(1.95)		(0.81)		(0.90)	
Unemployment Rate	1.305		1.371		1.586	
	(1.14)		(1.23)		(1.29)	
Gross Domestic Product Per Capita (in thousands)	0.001		-0.001		-0.0001	
	(0.01)		(0.00)		(0.00)	
Homestead Exemption	-0.134		-0.147		-0.295	
	(0.81)		(0.24)		(0.27)	
Homestead Exemption Squared	0.002		0.002		0.004	*
	(1.03)		(0.00)		(0.00)	
Rho			0.038			
			(0.21)			
Lambda					0.406	**
					(0.20)	
R-squared	0.30		0.32		0.34	
N	48		48		48	

Note:: *indicates significance at the 10 % level, **at the 5 % level, and *** at 1% level
In Column 1, Absolute t-statistics in parentheses, in 2 & 3, posterior std. deviations.
OLS corrected for heteroskedasticity using White's correction.

In the first two columns, failing to correct for the spatially dependent error structure biased downward the estimates of the impact of economic freedom, median age, and the square of the homestead exemption, which is now larger and statistically significant. The negative sign on the homestead exemption variable is the result of the credit access effect, while the positive and significant sign on the homestead exemption squared is the result of the wealth insurance effect. Thus, the homestead exemption actually reduces the rate of entrepreneurship until the wealth insurance effect begins to dominate. The larger coefficient on the EFNA term suggests that a one unit increase in a state's EFNA index would increase that state's score on the KIEA by 5.879 percentage points, other things equal. That is around 85 percent of a standard deviation increase in the change in a state's KIEA score. More importantly, correcting for spatial dependence only strengthens the positive relationship between economic freedom and entrepreneurship at the state level. These results presented in table 2 confirm the previous research by Kreft and Sobel (2005) and Campbell and Rodgers (2007) showing that economic freedom has a positive and significant impact on measures of entrepreneurial activity, but using this new measure of state entrepreneurial activity.

Conclusion

The evidence presented here suggests that differences in institutional quality help to explain differences in entrepreneurship across states. Combined with other research showing that entrepreneurship leads to higher levels of economic growth, we argue that entrepreneurship is the mechanism through which institutions are translated into economic growth. This finding helps explain the evidence that low-income regions converge towards high-income regions in a slow and discontinuous manner. The effect of institutions on entrepreneurial innovation make it the case that although capital and labor tend to move to where they are most valued, the higher levels of innovation in regions with good institutions disrupts the convergence and pushes areas with good institutions

ahead again. The persistence of differences in institutional quality thus helps to explain the persistence of income and wealth differences across states.

While borrowing from the literature on endogenous growth, this paper differs in its policy implications. Endogenous growth theory takes knowledge production and hence, research and development spending, as the key to generating increasing returns. We argue that the results presented here shows that it is good institutions that allow research and development to be translated into economic growth. Good institutions simply better channel productive resources to their highest valued use. Thus, state policymakers interested in improving economic growth in a state should focus on improving that state's economic freedom, rather than trying to pursue policies to increase the quantity of economic inputs (subsidies for education, technology, venture capital, etc.). While institutions are persistent and thus effecting institutional change is difficult, recognition that institutions matter is an important first step in the process of promoting entrepreneurial activity—the root source of economic growth and prosperity.

References

Barro, R., & X. Sala-i-Martin. (1992). Convergence. *Journal of Political Economy* 100(2): 223-51.

Baumol, W. (1990). Entrepreneurship: Productive, unproductive and destructive. *Journal of Political Economy* 98(5), 893-921.

Berkowitz, D., and D. DeJong. (2005). Entrepreneurship and post-socialist growth. *Oxford Bulletin of Economics and Statistics* 67(1): 25-46.

Boettke, P., and C. Coyne. (2003). Entrepreneurship and development: Cause or consequence? In *Advances in Austrian Economics* 6: 67-88.

Borts, G. (1960). The equalization of returns and regional economic growth. *American Economic Review* 50(3), 319-347.

Borts G., & J. Stein. (1964). *Economic growth in a free market*. New York: Columbia University Press.

Bruce, D. (2002). Taxes and entrepreneurial endurance: Evidence from the self-employed. *National Tax Journal* 55(1): 5–24.

Campbell, N., and T. Rodgers. (2007). Economic freedom and net business formation. *Cato Journal* 27(1): 23-36.

Cushing, B.J. (1987). Location-specific amenities, topography, and population migration. *Annals of Regional Science* 21(2): 74-85.

Dawson, J. (1998). Institutions, investment, and growth: New cross-country and panel data evidence. *Economic Inquiry* 36(4): 603-69.

Easterly, W. (2001). *The elusive quest for growth*: *Economists' adventures and misadventures in the tropics*. Cambridge: MIT Press.

Ellison, G., & E.Glaeser. (1999). The geographic concentration of industry: Does natural advantage explain agglomeration?" *American Economic Review* 89(2): 311-316.

Fairlie, R.W. (2006a). *Kauffman index of entrepreneurial activity: State Report 2005*. Kansas City, MO: Ewing Marion Kauffman Foundation.

Fairlie, R. W. (2006b). *Kauffman index of entrepreneurial activity: National report 1996-2005.* Kansas City, MO: Ewing Marion Kauffman Foundation.

Fan, W., and M. White. (2003). Personal bankruptcy and the level of entrepreneurial activity. *Journal of Law and Economics* 46(2): 543-567.

Garrett, T., and H. Wall. (2006). Creating a policy environment for entrepreneurs. *Cato Journal* 26(3): 525-552.

Glaeser, E., R. La Porta, F. Lopez-de-Silanes, and A. Shleifer. (2004). Do institutions cause growth? *Journal of Economic Growth* 9(3): 271-303.

Green, S., A. Melnyk, and D. Powers. (2002). Is economic freedom necessary for technology diffusion? *Applied Economics Letters* 9(14): 907-10.

Grossman, G. and E. Helpman (1994). Endogenous innovation in the theory of growth. *Journal of Economic Perspectives* 8: 23-44.

Gwartney, J., R. Holcombe, & R. Lawson. (2004). Economic freedom, institutional quality, and cross-country differences in income and growth. *Cato Journal* 24(3): 205-233.

Hall, R., & C. Jones. (1999). Why do some countries produce so much more output per worker than others?" *Quarterly Journal of Economics* 114(1): 83-116.

Heckelman, J.C., & M.D. Stroup. (2000). Which economic freedoms contribute to growth?" *Kyklos* 53(4): 527–544.

Holtz-Eakin, D. (1993). Solow and the states: Capital accumulation, productivity, and economic growth. *National Tax Journal*. 46(4): 425-439.

Kaldor, N. (1970). The case for regional policies. *Scottish Journal of Political Economy* 17: 337-48.

Karabegovic, A., & F. McMahon. (2006). *Economic freedom of North America: 2006 annual report*. Vancouver: The Fraser Institute.

Kirzner, I. (1997). Entrepreneurial discovery and the competitive market process: An austrian approach. *Journal of Economic Literature* 35(1): 60-85.

Kreft, S.., & R.. Sobel. (2005). Public policy, entrepreneurship, and economic growth. *Cato Journal* 25(3): 595-616.

Krugman, P. (1998). What's new about the new economic geography?" *Oxford Review of Economic Policy* 14(2), 7-17.

LeSage, J. P., & R. K. Pace (eds). (2004). *Introduction to Advances in Econometrics: Volume 18: Spatial and Spatiotemporal Econometrics.* Oxford: Elsevier

Martin, R., & P. Sunley. (1998). Slow convergence? The new endogenous growth theory and regional convergence. *Economic Geography* 74(3): 201-227.

Mueser, P., & P. Graves. (1995). Examining the role of economic opportunity and amenities in explaining population redistribution. *Journal of Urban Economics* 37(2): 176-200

Mulligan, G. (1984). Agglomeration and central place theory: A review of the literature. *International Regional Science Review* 9(1): 1-42.

North, D. (1990). *Institutions, institutional change, and economic performance*. Cambridge: Cambridge University Press.

North, D. (1991). Institutions. *Journal of Economic Perspectives* 5(1): 97-112.

Ovaska, T., & R. Sobel. (2005). Entrepreneurship in post-socialist economies. *Journal of Private Enterprise* 21(1): 8-28.

Parente, S. (2001). The failure of endogenous growth. *Knowledge, Technology and Policy* 13: 49-58.

Powell, B. (2003). Economic freedom and growth: The case of the Celtic Tiger. *Cato Journal* 22: 431-448.

Ricardo, D. ([1817] 2005). *Principles of political economy and taxation*. Vol. 1 of Piero Sraffa (ed.), *The Works and Correspondence of David Ricardo*. Indianapolis: Liberty Fund.

Romer, P. (1994). The origins of endogenous growth. *The Journal of Economic Perspectives* 8(1): 3-22.

Sobel, R., and A. Dean. (2006). "Has Wal-Mart buried mom and pop?: The impact of Wal-Mart on self employment and small establishments in the United States." West Virginia University Working Paper 06-06.

Solow, R. (1956). A contribution to the theory of economic growth. *Quarterly Journal of Economics* 70, 65-94.

Smith, A. ([1776] 1998). *An inquiry into the nature and causes of the wealth of nations*. Washington, D.C.: Regnery.

Summers, R. & A. Heston. (1991).The Penn World Table (Mark 5): An expanded set of international comparisons, 1950-1988. *Quarterly Journal of Economics* 106(2): 327-368.

U.S. Bureau of the Census. (2007). *Statistical abstract of the United States 2007*. Washington, D.C.: Government Printing Office.

Zacharakis, A., W. Bygrave, and D. Shepherd. (2000). Global entrepreneurship monitor: National entrepreneurship assessment, United States of America. Kansas City: Kauffman Center for Entrepreneurial Leadership.