

Entrepreneurship, Economic Growth and Public Policy

Zoltan J. Acs
Laszlo Szerb

ABSTRACT. This paper is an introduction to the second Global Entrepreneurship Research Conference. The conference focused on developing a better understanding of the relationships among entrepreneurship, economic growth and public policy, and variations according to the stage of economic development. The papers in this special issue conduct analysis with GEM micro-and-macro data, and offer several important policy recommendations. First, middle-income countries should focus on increasing human capital, upgrading technology availability and promoting enterprise development. It is important to start enterprise development policies early because the main drivers are perceptual variables that are difficult to change in the short run. Second, for developed economies, reducing entry regulations, in most cases, will not result in more high-potential startups. Both labor market reform and deregulation of financial markets may be needed to support growth of high-performance ventures.

KEY WORDS: Central Europe, development, entrepreneurship policy, GEM, micro data.

JEL CLASSIFICATION: L26, M13, O4, P3.

1. Introduction

The papers in this special issue focus on the relationship between entrepreneurship, economic growth and public policy. This question has been a core component of the economics literature as far back as Adam Smith. A related question – *how does public policy vary with the stage of economic development?* – has been

examined more recently in the economic development literature (Lucas, 1993), the regional science literature (Acs and Storey, 2004) and the entrepreneurship literature (Acs, 2006). There is empirical evidence that entrepreneurial activity varies across stages of economic development, indicated by a U-shaped relationship between level of development and the rate of entrepreneurship. A *positive* effect of entrepreneurial activity on economic growth is found for highly developed countries; a *negative* effect is found for developing nations (van Stel et al., 2005; Wennekers et al., 2005; Acs and Varga, 2005).

It is this policy interaction that motivated the second Global Entrepreneurship Monitor (GEM) Research Conference, in Budapest, Hungary from May 25 to 27, 2005. While economic growth and regional effects (agglomeration, networking, clustering) dominated in the first GEM research conference (Sternberg and Wennekers, 2005), this special issue largely addresses the development questions: the influence of government regulation on new firm startups, perceptual issues; international issues include immigration and access to foreign technology. Two strong sub-themes emerge in these papers: Cross-country comparisons and a special focus on Central European economies.

Altogether, there were 116 special guests, GEM members, experts, researchers and politicians in attendance. The purpose of this conference was to present an overview of state-of-the-art, current research on entrepreneurial activity in countries and regions covered by GEM. Since 1999, close to 40 national teams and 120 consortium participants have contributed to the GEM program. By 2004, the number of interviewed individuals exceeded 500,000 and more than 6,000 national entrepreneurship

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Zoltan J. Acs
School of Public Policy
George Mason University
Fairfax, VA, 22030, USA
E-mail: zacs@gmu.edu

Laszlo Szerb
Faculty of Business and Economics
University of Pecs
Pecs, 7601, Hungary

experts were asked their opinion about the entrepreneurial framework conditions. Therefore, a wide variety of research opportunities can come out of the GEM data (Reynolds et al., 2005). Initially 27 abstracts were submitted, of which 19 were accepted and 18 papers were ultimately presented in six sessions. Two papers were presented in one of the two roundtables. Finally, 10 papers were invited for publication consideration and 8 were selected for this special issue after the referee process.

In order to put the papers into historical perspective, the following section describes the emergence of entrepreneurial capitalism through the end of the last century. Section 3 provides structure to this analysis by categorizing a range of policies in an entrepreneurial economy: policies with effects on individual decisions to become an entrepreneur, national policies that affect the overall entrepreneurial environment, policies directed mainly at international commercial activity and regional policies. Section 4 describes the papers in this issue and discusses key findings from the conference. The final section examines specific policy implications for Central Europe.

2. Entrepreneurial capitalism

The U.S. economy has enjoyed remarkable economic success during the past decade, as indicated by the most important economic statistic: Rate of productivity growth. Over the long run, this determines the rate of advance in average living standards. After surging to 2.6% annually from 1950 to 1973, productivity growth dropped to 1.4% in the period from 1973 through 1995. Although this 1.4 percentage point annual decline may seem trivial, it has enormous consequences over time. At the earlier rate of 2.6%, living standards double every 28 years whereas at the rate of 1.4%, this doubling would take more than 50 years. What accounts for this good fortune so far? Conventional economic wisdom has converged on the opinion that the “information technology (IT) revolution” – especially rapidly falling prices of computer chips and their dependent products – has been critical. When measured by conventional statistics, there seems to be much truth in this (Oliner and Sichel, 2002).

However, a deeper change in the structure of the American economy itself – a decades-long transition from *managerial* to *entrepreneurial capitalism* – also seems to have played an important role in the acceleration of productivity growth (Acs and Armington, 2006; Audretsch et al., 2006; Baumol et al., 2007, among others). Acs first articulated that markets, new technology and entrepreneurship are at the heart of the transition from managerial to entrepreneurial capitalism, in *The Changing Structure of the U.S. Economy* (1984). Three distinct features of this increasingly entrepreneurial capitalism are noteworthy:

- *Firm structure is more dynamic.* After World War II, large firms, often in oligopolies, dominated the U.S. economy. Turnover among the largest firms was minimal and new firms played a minor role. This has changed dramatically in the last several decades. New firms offering new products and services (in IT, biotechnology and retail) and foreign entrants in traditional industries (such as automobiles and steel) have been major drivers, if not *the* main driver, of economic growth.
- *Markets and individual firms are replacing bureaucracies (inside and outside the private sector).* A hallmark of entrepreneurial firms is relatively flat management structures with rapid responsiveness to market demands, whereas large firms host more bureaucratic, hierarchal management and thus, decision-making takes longer. In the managerial economy, there was an implicit compact between “big labor, big business and big government.” (Galbraith, 1967). That compact, if it ever existed, is now clearly gone. Labor’s share of the workforce has fallen dramatically, big business is in flux (with constant changes in the rankings of America’s leading firms) and government functions at all sectors are increasingly being contracted out to the private sector.
- *Innovation is very different in managerial and entrepreneurial settings.* Led by risk-taking entrepreneurs, new firms are disproportionately responsible for “radical” or “break-through” technologies, although larger

managerial firms are typically needed to refine, mass-produce and market these technologies (Baumol, 1993). The innovations that now characterize modern life – the automobile, telephone, airplane, air conditioning, personal computer, most software and Internet search engines – were all developed and commercialized by entrepreneurs. Radical innovations tend to lead to faster overall growth than do incremental improvements. It is not a coincidence that the IT revolution – which has statistically accounted for the significant acceleration in US productivity growth over the last decade – was sparked largely by entrepreneurial companies (Acs and Audretsch, 1989).

How did this transformation occur? A brief discussion of historical context is useful. The interaction between economic growth and public policy dates back to the Mercantilist debates in the 17th century, but the introduction of entrepreneurship into this relationship is a relatively new topic (Acs et al., 2005; Autio, 2005). At the very least, any society interested in encouraging entrepreneurship must make it rewarding and easy to do. For the most part, the U.S. has developed laws and institutions over time to effectively do that: A legal system protects rights of contract and property (including intellectual property), state and local registration systems make it easy to form a business, the tax system has evolved towards lower marginal tax rates, and laws support a financial system that generally favors the formation and growth of new ventures (Schramm, 2004).

Several federal policy initiatives were adopted during Democratic and Republican administrations over the past three decades, which have supported the shift from a managerial to an entrepreneurial economy (Acs, 1984). These include:

- The removal of legal barriers to entry and price controls in a number of key industries, specifically transportation and communications
- Successive Executive Orders requiring executive branch agencies to at least study the costs

and benefits of introducing new regulations before adopting them, as well as legislation requiring agencies to tailor regulations to the “size and the resources of the affected business” (with special regulatory flexibility for small businesses seeking to raise capital)

- Various tax reforms that have had the effect of enhancing rewards from entrepreneurship, including cuts in the capital gains tax rate (from 49% prior to 1977 to a current rate of 15%) and reductions in the top individual marginal tax rate (from 70% prior to 1981 to a current rate of approximately 38%)
- Legal changes that have allowed pension funds to finance the formation and growth of new firms, by investing in venture capital partnerships; and
- Federal legislation aimed at accelerating the commercialization of innovations in universities (through the Bayh-Dole Act of 1980, which granted universities exclusive control over inventions funded by the federal government) and in small business (by earmarking 1.25% of federal R&D funds for small business, under the Small Business Innovation Development Act of 1982)

For these reasons, policy makers across all levels of government should not only have a strong interest in promoting entrepreneurship directly, but should also consider the impact their decisions on a range of issues are likely to have on entrepreneurial activity. In effect, we are interested in two different but related questions: *What should entrepreneurship policy look like?* and *What does policy look like in an entrepreneurial economy?* In the managerial economy, governments primarily tried to support the small and medium sector of the economy. However, much of this was to promote democracy and not efficiency. According to John Hancock, one of the signers of the Declaration of Independence, “The more people who own little businesses of their own, the safer our country will be, for the people who have a stake in their country and their community are its best citizens.” In other words, SME policy was less about productivity growth and more about political pluralism (Acs and

Audretsch, 2002; see Storey, 2003 for a full discussion).

A string of initiatives in the 1990s started to focus attention on individuals instead of firms. The first careful treatment of the distinction between SME policy and entrepreneurship policy was done by Lundstrom and Stevenson (2005). However, much of this was directed at *disadvantaged individuals*, so in effect, the result was more of the same: Bringing the disenfranchised into the economic mainstream. However, it was also recognized that much of the entrepreneurial activity that affected productivity growth was carried out by the “best and the brightest.” Hart (2003) addresses this from a regional high-technology perspective and Holtz-Eakin and Rosen (2004) present a broad view of this relationship.

However, all of these approaches miss the essential point: That there is no such thing as “entrepreneurship policy” per se – only *policy in an entrepreneurial economy*. Acs and Armington (2006, chapter 7) lay out, for the first time, a policy formulation for an entrepreneurial economy and examine the question as it relates to the making of economic society. This overarching perspective is now the subject of a Kauffman Foundation policy paper “Roadmap for an Entrepreneurial Economy” (Kauffman, 2006). A key question is: *How can policy makers maintain – and ideally accelerate – the continuing transition toward a more entrepreneurial economy?* We now address this question.

3. A policy framework for an entrepreneurial economy: the papers

An entrepreneurial economy is different from a managed economy because of the way in which it used entrepreneurs to facilitate knowledge spillovers (Acs et al., 2006). In the managed economy the organization exists exogenously and endogenously engages in the creation of new knowledge through investment in research and development. However, as Arrow (1962) pointed out investment in new knowledge is not straightforward. Organization inertia may result in new ideas not being commercialized either by the incumbent firm or by other firms. The spillover of knowledge that exists by assumption

in the Griliches (1992), Romer (1990) models may not be automatic but may be impeded by a filter, or what Acs et al. (2004) refer to as the knowledge filter. The knowledge filter serves to impede, if not preempt the spillover and commercialization of knowledge.

Entrepreneurship can contribute to economic growth by serving as a mechanism that permeates the knowledge filter. It is a virtual consensus that entrepreneurship revolves around the recognition of opportunities along with the cognitive decision to commercialize those opportunities by starting a new firm. Thus, according to the Knowledge Spillover Theory of Entrepreneurship, by serving as a conduit for knowledge spillovers that might otherwise not exist, entrepreneurship permeates the knowledge filter and provides the missing link to economic growth. According to evidence provided by Acs and Armington (2006) and Audretsch et al. (2006) entrepreneurship makes a unique contribution to economic growth by permeating the knowledge filter and commercializing ideas that would otherwise remain uncommercialized.

This leads to the question “What is policy in an entrepreneurial economy? Entrepreneurship policy is different from traditional business policy that tried to constrain the corporation. A new policy approach is emerging that focuses on enabling the creation and commercialization of knowledge. The policy also differs from small business policy that tried to confront the cost disadvantage of small firm due to scale economies. In contrast, entrepreneurship policy has a much broader focus. Entrepreneurship policy encompasses those measures that intend to directly influence the level of entrepreneurial activity in a country or region and the consequences of that action for society (Lundstrom and Stevenson, 2005).

This policy framework is written from the perspective of the US economy, which has emerged as the leading entrepreneurial economy in the world (Schramm, 2006). This is a useful background against which we may evaluate policy in other countries, both high- and middle-income. The papers in this special issue are interpreted from this policy framework. In essence, we are able to take an integrated approach to understanding how other countries

fit into this framework and how GEM research can make an important contribution to this understanding.

3.1. *Policies relating to the global economy*

It has become cliché to say that American firms and workers live in a global economy, but it is true nonetheless. As a result, entrepreneurs that ignore the global market do so at their peril when designing and implementing business plans. The implication for policy makers at all levels of government likewise is very clear: If they want to promote entrepreneurship, they must think globally rather than locally or even nationally. The Kauffman framework finds that this manifests in at least the following policy arenas: Trade (including policies of “off-shoring”), immigration, technology and foreign policy.

Trade Policy: Capitalist economies rest on a fundamental principle: The freedom of individuals and firms to contract with each other. It is through this freedom of exchange that economies realize the benefits of specialization, economies of scale and comparative advantage, which together maximize economic welfare. Exchanges of goods, services and capital across countries magnify the benefits of exchanges. This, in essence, is the classic case for free trade. Entrepreneurs and established firms alike cannot succeed in an increasingly global environment without the ability to move quickly and contract for the least cost, highest quality inputs, wherever they may be found. They also need to sell to purchasers wherever they may be located. This is not possible if governments maintain artificial barriers to impede the movement of goods, services, capital and ideas across national borders (Brainard et al., 2005).

Immigration Policy: In the wake of 9/11, U.S. immigration authorities have tightened legal immigration in the name of national security. More recently, Congressional proposals to criminalize and deport millions of illegal immigrants have generated vigorous debate in Washington, along with mass protests throughout the nation. An entrepreneurial perspective leads to several policy approaches with respect to legal and illegal immigrants. The

implication for legal immigration policy is clear: Place more emphasis on educational background of potential immigrants, while maintaining proper deference to the needs of national security (i.e. prevent the entry of individuals with criminal backgrounds and those whose past activities and associations pose a real threat). Future advances in American living standards require the commercial application of continued improvements in technology. In the past, immigrants have made huge contributions and will continue to do so if policies permit.

Access to Foreign Technology: One of the worst economic mistakes any business or country can make is to adopt the “not invented here” syndrome: The refusal to embrace something developed and used elsewhere. Certainly, this is not the case for many countries that have licensed or used American technology and in the process, have improved economic welfare. In some cases, this has occurred at a faster pace, though from a lower starting level, than in the U.S. Likewise, the U.S. has benefited from investment by foreign companies – especially those in the manufacturing sector – that have enabled technology transfer and introduce foreign products to the domestic market. For example, where would the American manufacturing sector be without “Just In Time” production systems or “quality circles” that were pioneered in Japan? The U.S., and its entrepreneurs, could do even better if government took a more active role in facilitating awareness of foreign technologies (Brezneitz, 2007).

Two issues stand out in the papers that address entrepreneurship in the global context: Access to foreign technology and immigration. Foreign Direct Investment (FDI) plays an important role in economic development policy. Since the late 1960s, Ireland has focused mainly on FDI-based industrial development policies. In the first paper, Acs-O’Gorman-Szerb-Terjesen builds on internationalization theory to answer the question: *Could the Irish miracle be repeated in Hungary?* This is important, as the potential for replication within Central Europe has not been examined. This paper uses GEM data to explore if, and how, the policy of attracting inward FDI from multinational

enterprises impacts indigenous entrepreneurial activity. Internationalization theory suggests that entrepreneurs in Ireland and Hungary will differ in terms of type of person and the nature of opportunities pursued. They find significant differences for both.

Ethnic minority entrepreneurship has attracted considerable attention from sociologists and others. In the second paper, "*Immigration In-migration, Ethnicity and Entrepreneurship in the United Kingdom*," Levie develops and tests hypotheses concerning the effect of migrant status and ethnicity on propensity to engage in new business formation at the individual level in the U.K. The large-scale empirical approach used by Levie enables estimation of the relative contribution of life-long residents, in-migrants and immigrants of different ethnicities to new business activity. The data suggests that – controlling for basic demographic variables and differences in opportunity perception, risk propensity and experience – being a migrant has a significant positive effect on propensity to engage in new business activity. Migration increases the chance of new business startups, although in-migration plays a more important role than immigration. The independent effect of ethnicity is only marginal. Overall, ethnic minorities as a group do not have a higher propensity to engage in new business activity, if one controls for differences in average age, gender, education and working status.

3.2. *Taking entrepreneurship into account in setting national policies*

Policymakers constantly confront a series of decisions that affect the economy. Many factors affect how these decisions are made. Given the presumptive causal link between long-term economic growth and entrepreneurial activity, it behooves policy makers to take into account the impact of their decisions on entrepreneurship. There are several essential points to consider in this regard:

The Fiscal Challenge: While the long-term budget outlook imperils the future economic welfare of all Americans, it poses particularly significant challenges to entrepreneurs, who face the greatest economic risks in the economy.

Growing fiscal imbalances create additional uncertainties, which make it more difficult to raise capital from investors and may discourage some individuals who might otherwise pursue an entrepreneurial path from acting. Fortunately, concerns about the growing federal budget problem are beginning to surface. The Comptroller General of the U.S. (who heads the federal government's official auditor, the General Accountability Office), various "think tanks" spanning the political spectrum and other organizations are beginning to sound the alarm for federal policymakers to address the fiscal crisis before it is too late. This framework recognizes that the likely solution will consist of a combination of measures to increase revenues and reduce future spending, especially on entitlement programs where costs are projected to increase most rapidly.

Education: Although not a guarantee of economic success, a strong educational system (primary, secondary, tertiary and higher) is clearly a prerequisite for continued economic growth. Provided the right incentives are in place to reward innovation, the greater the proportion of highly educated people, the more likely it is that some will generate and commercialize the breakthroughs that generate growth in incomes and living standards for all residents (and for many around the world as well). Innovations, even by a relative few, require many skilled workers to refine, produce, market and distribute the resulting products and services. America owes much of its economic success to its enviable record in providing universal primary and secondary education to its citizens.

Science and Technology Policy: Productivity improvements come about through technical change, which requires both the discovery of new ideas and their commercialization by entrepreneurs and existing firms. New ideas, in turn, are the product of research and development, which span the range from basic research (such as the discovery of new scientific laws or improvements in our understanding of basic science) to development activities (the embodiment of new ideas in products, services or production techniques). It is now well understood that because the benefits of basic research

cannot be fully captured by those who pursue it, society will be better off if government funds it and either pursues it directly or contracts it to universities and private sector research organizations.

Litigation and Regulation: It is important not only for government to facilitate the formation of new businesses but also to encourage their growth – or at the very least, not to penalize it. In this respect, it is vital that all levels of government remain committed to analyzing the costs and benefits of new regulations before adopting them and where possible, create appropriate allowances for streamlined procedures for new businesses. Particular attention should be paid to regulations that have the effect of deterring entry by new businesses, which typically do not have the resources or capability of complying to the same degree as more mature firms. At the same time, existing regulatory regimes bear further examination and some may need modification (the Sarbanes-Oxley Act is a prime example) (Kamara et al., 2005). Litigation can also have the same effect as regulation, resulting in verdicts that set norms for behavior by firms and individuals in specific industries or across many, or all, sectors of the economy. An inherent difficulty with “regulation-by-litigation”, however, is that the rules that emerge from individual, fact-specific litigated cases are decided by randomly chosen juries, in cases across the country. It is somewhat anomalous that a jury in one particular place can have the effect of setting national norms, especially if that place is sufficiently important to a national manufacturer so that it must do business in that state. In the process, therefore, the most restrictive state can have the effect of setting the national norm.

As the abovementioned considerations indicate, the national level addresses policies that affect the economy as a whole. The papers by van Stel-Storey-Thurik and Ho-Wong both use World Bank data to examine the impact of regulation on startups for GEM countries. The first paper is concerned with Europe and the second paper with Asia. The van Stel-Storey-Thurik paper finds that entry regulations requirements have only had a small and indirect impact on the actual entrepreneurship rate, and

that the impact of labor market regulations and financial requirements is more important. Differences between determinants of opportunity and necessity entrepreneurship emerge in both papers for regulatory costs. This has a negative effect on the nascent entrepreneurship rate across countries. The Ho-Wong paper finds that informal capital is important in overcoming liquidity constraints, in addition to showing that regulatory costs deter opportunity entrepreneurship.

3.3. Regional policies to promote entrepreneurship

Like politics, entrepreneurship is local. If successful, individuals expand their enterprises into other locations. Still, all new firms must start somewhere, even if the business is conducted largely or exclusively on the Internet (Acs and Armington, 2006). Policymakers likewise are increasingly recognizing entrepreneurship as the key to building and sustaining economic growth. Historically, much of the thinking and policy has focused on trying to attract existing firms *from somewhere else*, either to relocate or to build new facilities in a particular area. Such “smokestack chasing” has degenerated into what is essentially a zero-sum game for the national economy as a whole. When one city or state offers tax breaks or other financial inducements to encourage firms to locate new plants or headquarters, some alternate city or state loses that economic activity. However, the idea of economic development *centered around entrepreneurship* is a fundamentally different approach. The formation and growth of *new firms*, wherever this occurs, is clearly a *positive sum game* – not just for the locality, but for the nation as a whole.

A brief look at various “high-tech” clusters around the country – from Silicon Valley, to Austin, Research Triangle Park (North Carolina), San Diego, Boise, Denver, Madison, Route 128 around Boston, Northern Virginia, to name just a few – demonstrates the overall positive effects of development around entrepreneurship. The United States economy has clearly benefited, as a whole, from the innovative products and services that have emerged from these clusters. The same can be said for

other countries as well. High-tech, high-growth clusters in India, China, Taiwan, Ireland and Israel – to name a few – are powering economic growth far beyond these countries. Some clusters host firms that have become essential within a worldwide supply chain. Others are becoming leaders in new product and services development. Still others are doing both.

In the Bergmann-Sternberg paper, the authors address regions and individual characteristics related to entrepreneurship. They focus on policies that may be used to increase the number of startups in Germany. They conclude that these policies have made starting a business more attractive for unemployed people in Germany, while at the same time becoming more restrictive in unemployment benefits. The results show that individual and regional variables have an influence on the decision to become self-employed and for the most part, the results of opportunity startups are in line with theoretical predictions. The factors influencing necessity startups, on the other hand, are far more difficult to determine. Necessity startups due to a lack of employment are predominantly launched independently of age, gender, education and regional influences, due to individual perception of economic need.

3.4. Policies that primarily affect entrepreneurs

There are policies directed at entrepreneurs themselves within any entrepreneurial framework. These affect individual decisions to “take a job or make a job” – that is, to work for someone else or to make the riskier, but potentially more profitable, choice and launch an enterprise.

Easing Business Formation: Entrepreneurs cannot be expected to “take the plunge” unless it is easy and inexpensive to form their businesses. The U.S. government has done this well at all levels, a judgment confirmed by the World Bank. Still, there is room for improvement, particularly at the state and local levels, where businesses actually register and must acquire various permits. For example, there is the possibility to make it easier for new and existing firms to obtain and submit requisite forms on the Internet. This is likely to be cheaper and more quickly accomplished than building new

(or retrofitting existing) physical facilities such as “one-stop shops.” Some cities already have done this, and other cities and states may wish to consider doing so in conjunction with an active Web-based initiative.

Ensuring Access to Finance: Virtually all-new business ventures require some initial amount of capital and often more as they grow. The U.S. has been able to create a financial system conducive to business formation and growth. The “democratization” of credit markets, whether through credit card or mortgage lending, has enabled many entrepreneurs without personal, family or friends wealth to get started (Blanchflower et al., 2003). In the past several decades, a vibrant venture capital industry has developed to fund the relatively small but vital number of technologically sophisticated or capital-intensive start-ups. In recent years, “angel investors” – wealthy individuals or groups of such individuals – have become an increasingly important source of early-stage equity capital as well (by some accounts, angel investors may now be more important than venture capital, especially since the “Internet stock bubble” burst in 2000). As for debt finance, banks and finance companies have been the traditional sources of funds. However, both types of lenders are facing increasingly stiff competition from securities markets that are financing a growing share of debt taken on by larger entrepreneurial firms that have gone public.

Appropriate Protection of Intellectual Property: One of the ways entrepreneurial economies motivate people to become entrepreneurs is by giving their ideas legal protection. This is accomplished with intellectual property laws such as patents, copyrights and trademarks. There is a complicated tradeoff involved when providing exclusive property protection to inventors or creators (Merrill et al., 2004). If protection is granted for too long or is excessively easy to obtain, then government is essentially permitting monopolies and public returns are limited. On the other hand, if protection of intellectual property is too weak, or if legal protections can be easily circumvented through technological means, then inventors and creators may have insufficient incentives to bring their ideas to market.

Tax Policy: Rewards for entrepreneurial activity, as for any other economic activity, are reduced by taxes on earnings. At the same time, tax revenue collected by income and other taxes funds public goods – such as the physical and legal infrastructure, education, defense and crime detection, punishment and prevention – without which entrepreneurs (and all citizens) could not pursue their endeavors. A central challenge for policy makers at all levels of government is to undertake public measures whose benefits outweigh costs, and to implement and fund them to least distort economic activity (Gentry and Hubbard, 2004). Taxes are and should certainly be determined with more than entrepreneurship in mind. Considerations of revenue adequacy, simplicity and fairness also play an important role. The next section includes a discussion of a broad direction for future tax policy that is likely to be consistent with promoting, or at least not discouraging, entrepreneurial activities while, at the same time, adequately funding government programs and promises.

The Minniti-Nardone paper contributes to the research on entrepreneur-level factors. Gender differences in entrepreneurship have typically been attributed to differences in human and social capital, differences in risk tolerance and management styles, and to women being more sensitive than men to non-monetary factors. On the other hand, research has shown that men and women tend to react to the same set of incentives and much of the difference across genders disappears after correcting for some socio-economic conditions. The purpose of the paper is to investigate what variables cause gender differences in entrepreneurship and whether they are independent from country effects. It is clearly possible for these differences not to depend on work conditions but rather to be the effect of factors that co-vary systematically with gender. The analysis shows that although work status and education have some minor gender specific impact, the relationships between the likelihood of starting a business and age, household income, work status and education do not depend on gender. The results support the conclusion that perceptual variables play a crucial role in explaining entrepreneurial

differences across genders. Overall, the findings confirm the importance of cognitive processes within the context of specific market processes. This means that entrepreneurial discovery is not a pure bolt but is based on the ability to perceive and act upon an unexploited opportunity. The subjective perception of possessing skills is the most important variable, while opportunity recognition and fear of failing offer less explanatory power. There are no real socio-economic or contextual based differences between male and female entrepreneurs.

Szerb-Rappai-Makra-Terjesen focus on informal investment in Croatia, Hungary and Slovenia. This Central European focus is welcome because much less is known about entrepreneurship in middle-income countries. What is the reason for the low level of entrepreneurial activity in Central European countries? While it is generally believed that financial constraints are particularly important, the presence and reason for the existence of the finance gap should be examined further. If informal investors are vital for opportunity-oriented new firm start-ups (Bygrave and Hunt, 2004), then the lack of these sources may explain the low levels of entrepreneurial activity found across middle-income countries, including those in Central Europe. The authors investigate the factors driving investor decisions and find that differences in the informal investor ratio can be explained mainly by perceptual variables and less by limited entrepreneurial activity. Unfamiliarity with start-ups, limited business leadership skills, little opportunity perception and more generally, inexperience in market economies explain the low level of informal investment and amounts of investments in transition economies. However, it is unclear that the level of entrepreneurship in these middle-income countries is too low, and that more informal investors would actually make a difference.

The Tominic-Rebernik paper explores whether significantly different growth aspirations of early stage entrepreneurs in Slovenia, compared to those in Hungary and Croatia, are also accompanied by significantly different opportunity recognition, cultural support for entrepreneurship and self-efficacy. Despite similar history and socio-economic conditions, there are

differences in the growth aspirations of early-phase entrepreneurs in these countries. The results suggest that a higher degree of alertness to unexploited opportunities, along with cultural support for entrepreneurial motivation, may be the reason for higher growth aspirations of Slovenian early stage entrepreneurs. Self-efficacy with regard to entrepreneurial skills, knowledge and experience was not found to be crucial.

4. Characteristics of the papers

Four of the eight papers in this volume rely on individual-level data while the remaining four use aggregated, countrywide data. They reflect a wide variety in level of analysis. The Bergman-Sternberg paper uses a large individual dataset for Germany and the United Kingdom and focus on regional issues. The Levie paper also examines entrepreneurship at the regional level. The Szerb-Rappai-Makra-Terjesen the Tominc-Rebernik papers analyze and compare Croatia, Hungary and Slovenia, while the Acs-O'Gorman-Szerb-Terjesen, paper contrasts Ireland and Hungary. More than 30 countries are included in the analysis in the Minniti-Nardone, the van Stel-Storey-Thurik and the Ho-Wong papers (see Table I).

With regard to data, it is clear that a major advantage of the GEM research is its size. Six of the eight papers conduct analysis of data with no less than 10,000 individual observations. With a larger sample size of two countries, Germany and the United Kingdom, this makes its possible to push the level of analysis to the regional level while maintaining enough degrees of freedom. More and more authors combine GEM data with other, mainly aggregate (regional or country) datasets. Only the papers by Minniti-Nardone and Tominch-Rebernik rely

solely on GEM data. Two papers, by Ho-Wong and van Stel-Storey-Thurik, present successful combinations of GEM and the World Bank Doing Business databases at the country level.

The examination of a small percentage of businesses that grow exceptionally fast has gained ground, and it has become clear in recent years that these types of businesses are responsible for most job creation and a significant share of economic growth. In order to analyze these rapidly growing businesses, Ho-Wong and Tominic-Rebernik created a third category: High-growth entrepreneurship or high-growth aspiration entrepreneurship, respectively. The van Stel-Storey-Thurik paper makes another distinction by differentiating between nascent entrepreneurs and new business formation.

The unique GEM dataset makes it possible to use various statistical and econometric methods. Two recently developed sampling methods, bootstrapping and CHAID, enabled Minniti-Nardone and Levie to test their hypotheses in a more reliable way. By far, the logit model proved to be the most popular econometric method. Levie applies the classic binomial logit model while Bergmann-Sternberg used a modified version of logit (svylogit) to incorporate regional variables at the individual level. The Szerb-Rappai-Makra-Terjesen paper built on a multinomial logit analysis by separating two groups of informal investors, namely business owners and non-owners. The two papers of Ho-Wong and van Stel-Storey-Thurik employed least squares methods on aggregated country data. Finally, χ^2 and F-test methods were used for country comparison in Tominch-Rebernik and Acs-O'Gorman-Szerb-Terjesen, respectively.

These papers are similar in their treatment of so-called perceptual variables. Perceptual

TABLE I
The unit and the level of the analysis of the papers in this volume

Unit of analysis/level of analysis	Regional	Country-wide (2–3 countries)	International (many countries)
Individual	Levie Bergmann-Sternberg	Szerb-Rappai-Makra-Terjesen Tominc-Rebernik Acs, O'Gorman, Szerb and Terjesen	Minniti-Nardone
Aggregate	–	–	Van Stel-Storey-Thurik Ho-Wong

variables of opportunity perception, knowing an entrepreneur, start-up skills and fear of failing explain gender differences in entrepreneurship (Minniti-Nardone), the effect of migration on regional entrepreneurship (Levie), variations in informal investment propensity (Szerb-Rappai-Makra-Terjesen), alteration in the CEE country entrepreneurship (Tominc-Rebernik) and dissimilarity between Irish and Hungarian entrepreneurship (Acs et al., this issue).

Since entrepreneurship is a multidisciplinary subject, there is no dominant explanatory theory. A range of theories across disciplines has guided the papers in this special issue. Labor economics theories (occupational choice and displacement) were applied by Levie and Bergmann-Sternberg. The papers by Ho-Wong and Szerb-Rappai-Makra-Terjesen employed pecking order hypothesis from the finance literature, while Minniti-Nardone and Tominc-Rebernik used popular psychology and sociology approaches in their papers. Probably the most comprehensive theoretical perspective is the two-equation model applied by van Stel-Storey-Thurik, where a distinction is made between nascent and young business entrepreneurship, acknowledging the fact that each entrepreneur has to go through the nascent phase before he or she can actually become a young business entrepreneur. Acs, O'Gorman, Szerb and Terjesen present a unique theoretical perspective by integrating internationalization with entrepreneurship (Table II).

5. Policy implications

The main findings offer important policy implications for the link between entrepreneurship and economic growth. In addition to the shared view of the importance of perceptual variables, several papers conclude that government policy aimed at promoting entrepreneurship or influencing relevant factors cannot be effective in the short run, primarily because of cultural embeddings. Minniti-Nardone, Szerb-Rappai-Makra-Terjesen, Tominc-Rebernik and Acs-O'Gorman-Szerb-Terjesen find this. The Tominc-Rebernik paper finds perpetual variables to be the main drivers to entrepreneurship, and that entrepreneurial history is important in

determining current entrepreneurial activity in a society. Minniti-Nardone suggests that there is no real socio-economic or context-based difference between male and female entrepreneurs, and that perpetual variables are the underlying sources of gender differentials in new firm formation.

Based on the Szerb-Rappai-Makra-Terjesen findings that informal investment is affected by business ownership and not by family relations, policy should focus on long-term enhancement of basic tools for an entrepreneurial society. In the short term, policy should focus on information, skill development and opportunity recognition, which make it easier for the entrepreneur himself to act.

Population and demographic implications come out of the Levie paper. This paper found that migration increases the chances of new business start-ups, though in-migration is more important than immigration. The effect of ethnicity as a separate factor is found to be only marginal. Immigration policy reform is important in order to attract highly qualified individuals as well as technology from other countries. This is beneficial for both middle income and high-income countries, which should work to increase the environmental attractiveness of their regions to potential migrants. Policies that make immigration easier should lead to more new companies.

The Ho-Wong paper concludes that a careful and uniform approach of government policy should focus on decreasing entry barriers and capital requirements. In contrast, Van Stel-Storey-Thurik finds entry regulations to have a limited effect on the actual entrepreneurship rate. They suggest that entry regulation influences the distribution of entrepreneurial activity between the formal and the informal economy, rather than influencing the total volume of entrepreneurial activity. Therefore, according to Van Stel-Storey-Thurik, policies designed to reduce entry regulation barriers may not be effective. Ho-Wong finds that regulatory business costs have a negative effect on opportunity entrepreneurship but a limited effect on necessity and high-growth potential start-ups.

For middle-income countries that wish to become high-income countries, such as those in

TABLE II
The main characteristics of the papers

Papers	Data from ... countries	Data from ... year(s) of	Other data source	Level of analysis	Applied statistical/econometric method	Main topic	Theory background
Minniti–Nardone	37	2002	No	59,304 individuals	Bootstrapping	Explaining cross country gender differences in new business creation	Various, entrepreneurship, psychology, and sociology
Levie	1 (United Kingdom)	2003, 2004	UK regional data	~40,000 individuals UK regions	Logit analysis CHAID analysis	The investigation of the effect of different types of migration on local entrepreneurship activity	Employment decision making, Migration theory
Bergmann–Sternberg	1 (Germany)	2001, 2003, 2004	German regional data	16,478 individuals 97 planning regions	Logit analysis (svylogit)	The analysis of the influence of entrepreneurship promotion policy on start-ups	Labor economics Displacement theory
Van Stel–Storey–Thurik	39	2002–2005	World Bank Doing business	Aggregated on country level	Two equation OLS	The investigation of the entry and labor regulation on entrepreneurship	Public policy, Eclectic framework of entrepreneurship
Ho-Wong	37	2002	World Bank Doing business	Aggregated on country level	Linear least squares	The analysis of the availability of financing and regulatory business costs on entrepreneurship propensity	Industrial organization, Pecking order theory
Szerb-Rappai–Makra–Terjesen	3 (Croatia, Hungary, Slovenia)	2001–2004	Hungarian business angel data	18,940 individuals	Multinomial logit analysis, Cluster analysis	Explaining and identifying the determinants of informal investment in the three CEE countries	Pecking order theory, Empirically related studies on informal investment
Tominc – Rebernik	3 (Croatia, Hungary, Slovenia)	2001–2004	No	18,940 individuals	Chi-square test	Explaining the influential factors and the differences of entrepreneurial activities in three CEE countries	Growth theory, Opportunity recognition models, Sociology
Acs, O’Gorman, Szerb and Terjesen	2 (Hungary, Ireland)	2002–2004	Various country data	10,841 individuals	F-test	Investigating the effect of FDI on indigenous entrepreneurship Comparing Ireland and Hungary long term development	Internationalization theory

Central Europe, they should focus on increasing human capital and upgrading technology. This should be done with special attention to FDI and the promotion of enterprise development, as suggested by the findings of the Acs and Terjesen (2005). Although entrepreneurship in middle-income countries will be at a low level, it is important to start enterprise development policies with a long term mindset because as Minniti-Nardone found, the main drivers are perceptual variables that are difficult to change.

For high-income countries in Western Europe that want to promote high-growth startups, reducing entry regulations will, in most cases, not achieve this. Both labor market reform and financial market reform will be needed to grow high performance companies, as suggested earlier in this introduction. The various papers in this special issue support this. Further, the Bergmann-Sternberg paper finds that general policy can have extensive effects at the regional level.

Regional policies play an important role in entrepreneurship. However, it is not clear that pursuing policies to push the unemployed into necessity entrepreneurship has any overall positive social benefits, unless it is part of a strategy to reshape cultural factors over time. Cultural support of entrepreneurship plays a role in indigenous entrepreneurship, as found by the Acs, O'Gorman, Szerb and Terjesen paper. Finally, attempts to address the gender gap through policy are very likely to fail, given the findings that perceptual variables are subjective and hard to change.

The policy implications that emerge from these papers offer specific and realistic directions for policy planning in countries ranging in economic development status. In addition, they highlight important policy agendas that may overlap and affect entrepreneurship activity. For example, the importance of in-migration, as determined by Levie, and the importance of FDI, as determined by Acs-O'Gorman-Szerb-Terjesen may be further connected by indirect links including diaspora relationships, social networks, etc. The role of perceptual as opposed to socioeconomic variables may be relevant to immigration issues and is certainly relevant to labor market and financial system reform. The implications from this special issue are impor-

tant as individual directives for policy as well as foundations from which combinatory and further research may be conducted.

References

- Acs, Z. J., 1984, *The Changing Structure of the U.S. Economy*, New York: Praeger.
- Acs, Z. J., 2006, 'How is Entrepreneurship Good for Economic Growth?', *Innovations* 1(1), 97–107.
- Acs, Z. J., P. Arenius, M. Hay and M. Minniti, 2005, *Global Entrepreneurship Monitor: 2004 Executive Report*, Babson College and London Business School.
- Acs, Z. J. and C. Armington, 2006, *Entrepreneurship, Geography and American Economic Growth*, Cambridge: Cambridge University Press.
- Acs, Z. J. and D. B. Audretsch, 1989, 'Innovation in Large and Small Firms: An Empirical Analysis', *The American Economic Review* 78(4), 678–689.
- Acs, Z. J. and D. B. Audretsch, 2002, *The Emergence of Entrepreneurial Society*, Sweden: Stockholm.
- Acs, Z. J., D. B. Audretsch, P. Braunerhjelm and B. Carlsson, 2004, *The Missing Link: The Knowledge Filter and Entrepreneurship in Endogenous Growth*, Center for Economic Policy Research, Discussion Paper.
- Acs, Z. J., D. B. Audretsch, P. Braunerhjelm and B. Carlsson, 2006, *The Knowledge Spillover Theory of Entrepreneurship*, Center for Economic Policy Research, Discussion Paper.
- Acs, Z. J., O. C. Gorman, L. Szerb and S. Terjesen, this issue, Could the Irish Miracle be Repeated in Hungary.
- Acs, Z. J. and D. J. Storey, 2004, 'Introduction: Entrepreneurship and Economic Development', *Regional Studies* 38(8), 871–877.
- Acs, Z. J. and S. Terjesen, 2005, *Born Local: Two Views of Internationalization*, Paper presented at JIBS CIBER Conference: Emerging Research Frontiers in International Business Studies, Rotterdam, September 28–30, 2005.
- Acs, Z. J. and A. Varga, 2005, 'Entrepreneurship, Agglomeration and Technological Change', *Small Business Economics* 24(3), 323–334.
- Arrow, K., 1962, Economic Welfare and the Allocation of Resources for Invention, in R. R. Nelson (eds.), *The Rate and Direction of Inventive Activity*, Princeton: Princeton University Press, 609–626.
- Audretsch, D. B., M. C. Keilbach and E. E. Lehmann, 2006, *Entrepreneurship and Economic Growth*, New York: Oxford University Press.
- Autio, E., 2005, *Global Entrepreneurship Monitor: 2005. Report on High-Expectation Entrepreneurship*, Babson College and London Business School.
- Baumol, W. J., 1993, *The Free Market Innovation Machine*, Princeton, N.J: Princeton University Press.
- Baumol, W. J., R. E. Litan and C. J. Schramm, 2007, *Good Capitalism, Bad Capitalism*, New Haven: Yale University Press.
- Blanchflower, D., P. Levine and D. Zimmerman, 2003, 'Discrimination in The Small Business Credit Market', *Review of Economics and Statistics* 85(4), 930–943.

- Brainard, L., R. E. Litan and N. Warren, 2005, *Insuring America's Workers in a New Era of Off shoring*, Policy Brief No. 143, The Brookings Institution, Washington D.C.
- Brezneitz, D., 2007, *Innovation and the State*, New Haven: Yale University Press.
- Bygrave, W. and S. Hunt, 2004, *Global Entrepreneurship Monitor: 2004 Financing Report*, Babson College and London Business School.
- Galbraith, J. K., 1967, *The New Industrial State*, New York: New American Library.
- Gentry, W. M. and R. G. Hubbard, 2004, "Success Taxes, Entrepreneurial Activity and Innovation," *NBER Working Paper 10551*, Cambridge, MA: National Bureau of Economic Research.
- Griliches, Z., 1992, 'The Search for R & D Spillovers', *Scandinavian Journal of Economics*, **94**, 29–47.
- Hart, D. M., 2003, *The Emergence of Entrepreneurship Policy: Governance, Start-ups, and Growth in the U.S. Knowledge Economy*, Cambridge: Cambridge University Press.
- Holtz-Eakin, D. and H. Rosen, 2004, *Public Policy and the Economics of Entrepreneurship*, Cambridge: MIT Press.
- Kamara E., P. Karaca-Mandic and E. Talley, 2005, *Going-Private Decisions And the Sarbanes-Oxley Act*, Kauffman-Rand Center for the Study of Small Business and Regulation, September.
- Kauffman Foundation, 2006, Roadmap for an Entrepreneurial Economy.
- Lucas, R., 1993, 'Making a Miracle', *Econometrica* **61**(2), 251–272.
- Lundstrom, A. and L. A. Stevenson, 2005, *Entrepreneurship Policy: Theory and Practice*, Boston: Springer.
- Merrill, S. A., R. C. Levin and M. M. Meyers, 2004, *A Patent System for the 21st Century*, Washington, D.C: The National Academies Press.
- Oliner S. D. and D. E. Sichel, 2002, "Information Technology and Productivity: Where are We Now and Where are We Going?" *Federal Reserve Bank of Atlanta Economic Review*, pp. 15–44.
- Reynolds, P., N. Bosma, E. Autio, S. Hunt, N. DeBono, I. Servais, P. Lopez-Garcia and N. Chin, 2005, 'Global Entrepreneurship Monitor: Data Collection Design and Implementation, 1998–2003', *Small Business Economics* **24**(3), 205–231.
- Romer, P., 1990, 'Endogenous Technological Change', *Journal of Political Economy* **98**(5, Part 2), S71–S102.
- Schramm, C. J., 2004, 'Building Entrepreneurial Economies', *Foreign Affairs* **83**(4), 104–115.
- Schramm, C. J., 2006, *The Entrepreneurial Imperative*, New York: Collins.
- Storey, D. J., 2003, Entrepreneurship, Small and Medium Sized Enterprises and Public Policies, in D. B. Audretsch. Z. J. Acs (eds.), *Handbook of Entrepreneurship Research*, Boston/Dordrecht: Kluwer Academic Publishers, 476–511.
- Sternberg, R. and S. Wennekers, 2005, 'Determinants and Effects of New Business Creation Using Global Entrepreneurship Monitor Data', *Small Business Economics* **24**(3), 193–203.
- Van Stel, A., M. Carree and R. Thurik, 2005, 'The Effect of Entrepreneurial Activity on National Economic Growth', *Small Business Economics* **24**(3), 311–321.
- Wennekers, A. R. M., A. J. vanStel, A. R. Thurik and P. D. Reynolds, 2005, 'Nascent Entrepreneurship and the Level of Economic Development', *Small Business Economics* **24**(3), 293–309.

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