



The Origins of Entrepreneurial Opportunities

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Abstract. Kirzner's (1973) theory of entrepreneurship emphasizes the equilibrating role of entrepreneurship. When the market is not in equilibrium, profit opportunities exist, and entrepreneurs discover and act on these profit opportunities to equilibrate the market. Because Kirzner focuses on entrepreneurial actions when profit opportunities exist, and does not describe where they come from, one could imagine a fixed stock of profit opportunities that get used up as entrepreneurs discover them. But new profit opportunities are being created constantly. A taxonomy of the origins of entrepreneurial opportunities includes factors that disequilibrate the market, factors that enhance production possibilities, and most notably, opportunities created from previous acts of entrepreneurship. Entrepreneurial actions do not use up profit opportunities, but create them, and the critical role of entrepreneurship in the creation of new profit opportunities is emphasized. This line of reasoning leads directly to policy implications regarding the economic environment conducive to entrepreneurial discovery and the role of government in research and development. This paper enhances Kirzner's theory of entrepreneurship by illustrating how entrepreneurship enlarges the stock of future entrepreneurial opportunities, and points to entrepreneurship as the engine of economic progress.

Key Words: entrepreneurship, economic growth, equilibrium, profit, research and development

JEL classification: D20, Production and Organizations, General.

The Origins of Entrepreneurial Opportunities

Entrepreneurship occurs when an individual acts to take advantage of a profit opportunity that presents itself in the economy. In its simplest form, the entrepreneur might notice that one person is willing to sell something for less than someone else is willing to pay for it, so the entrepreneur can act as a middle man, profiting from buying at the lower price and selling for more. The profit, which is the return to the entrepreneur's alertness to the opportunity, was created entirely by the entrepreneur's activity, because the sale would not have taken place without someone having noticed the profit opportunity. The entrepreneur's activity benefits the buyer, the seller, and more generally, the entire economy. Furthermore, the entrepreneur's profit signals potential suppliers and demanders about their market opportunities, and even signals other potential middlemen of the profit opportunity for facilitating exchanges. Eventually the ability to earn above-normal profits will be competed away, but only after those profits have served their role in signaling a way in which resources could be more efficiently allocated in the economy. Entrepreneurship is indispensable for economic progress, but entrepreneurial activity is possible only when profit opportunities are available to the entrepreneur. This paper discusses the ways in which those profit opportunities can arise in an economy.

The entrepreneurial process is often more complex than simply having an entrepreneur notice that something can be purchased from one party and sold at a profit to another. Two complicating factors are production and time. For example, the entrepreneur might conjecture that if several inputs are purchased today and combined in a production process that occurs over time to produce some new output, that output could be sold in the future for more than it costs to purchase the inputs today. Yet these complexities do not alter the fundamental nature of entrepreneurship. While entrepreneurial opportunities are more difficult to spot when they involve production and time, and while they also involve some uncertainty about the outcome, the essential entrepreneurial act is still the noticing and acting upon a profit opportunity. Kirzner (1973) has emphasized the role of entrepreneurship in equilibrating an economy and leading to a more efficient allocation of resources, but Kirzner's model of entrepreneurship has focused on the behavior of entrepreneurs in response to profit opportunities. This paper discusses where those profit opportunities originate, thus making Kirzner's model of entrepreneurship more complete.

If one views the economy as tending toward equilibrium, and accepts Kirzner's entrepreneurs as the economic agents who act on profit opportunities that exist in disequilibrium in order to equilibrate the economy, then eventually all of those profit opportunities will be competed away, and the economy will remain in equilibrium. What produces the profit opportunities to begin with? This paper identifies three major categories of factors that create profit opportunities: (1) Factors that disequilibrate the market; (2) Factors that enhance production possibilities; and (3) Entrepreneurial activity that creates additional entrepreneurial possibilities. An analysis of each of these categories leads to the conclusion that by far the most significant cause of entrepreneurial opportunities is prior entrepreneurial activity. Entrepreneurship creates the opportunity for more entrepreneurship, which leads to economic progress. Entrepreneurship provides an important equilibrating function, but also is the crucial element in economic growth. After discussing the theoretical relationship between entrepreneurship and economic growth, the paper considers the institutional framework that is most conducive to entrepreneurship and growth.

Entrepreneurship in Economic Models

Paradoxically, while entrepreneurship has been becoming an increasingly important part of the economy in the twentieth century, it has been becoming increasingly less important as a part of economic theory.¹ Entrepreneurship occurs when an individual notices and acts on a profit opportunity, but in the equilibrium models that dominate economics at the end of the twentieth century, all profit opportunities have already been exploited, meaning that there is no role for entrepreneurship in this type of model.² To capture the role of entrepreneurship, economists must focus their attention on the process that leads individuals to seek profit opportunities, rather than on a state of equilibrium in which, by assumption, no profit opportunities exist. The benefits of studying the process by which economies adjust while moving toward equilibrium should be obvious, because even the staunchest equilibrium theorist will agree that while economic forces always pull the economy toward an equilibrium, equilibrium is a moving target that the economy always approaches but never reaches. It makes sense, then, to devote attention to the

process that always is occurring, rather than focusing exclusively on the result that never occurs.

In contrast to the economic mainstream, Kirzner (1973, 1979, 1985, 1999) has consistently focused his attention on the role of entrepreneurship in the equilibrating process.³ Kirzner has focused mainly on the equilibrating role of entrepreneurial action, but the central role of equilibrium to Kirzner's vision of entrepreneurship indicates that the concept of equilibrium is important to understanding the concept of entrepreneurship. In a perfectly competitive economy in a condition of equilibrium, there are no above-normal profits that can be exploited, and there are no entrepreneurial activities occurring. There is still a role for good management in equilibrium, to ensure that firms are combining their inputs at lowest cost to produce their outputs, but this management, as depicted in models such as those by Coase (1937) and Alchian and Demsetz (1972), is not entrepreneurship. Entrepreneurship occurs when individuals act upon previously unnoticed profit opportunities, whereas management works to make the production process as efficient as possible by maximizing the amount of output that is produced by a given level of input.⁴ Note that in equilibrium there is no entrepreneurial activity, but management is still necessary to prevent shirking and other forms of resource waste.

By studying the characteristics of markets and economies in equilibrium, economists forego the opportunity to examine the nature of the equilibrating forces that lead toward equilibrium, and it is this emphasis on equilibrium concepts that has pushed entrepreneurship out of most economic models. Yet entrepreneurial activity, which is often assumed away in order to focus on the nature of equilibrium, is the force that drives the economy to allocate resources efficiently and to increase its productivity over time. Thus, an examination of the origins of entrepreneurial opportunities is not just a digression into an unimportant detail, but rather is aimed at understanding one of the most important activities in an economy.

Entrepreneurship and Knowledge

One of the assumptions underlying the neoclassical model of perfect competition is that everyone in the economy has perfect knowledge about all economic opportunities.⁵ This assumption rules out the possibility that any unrecognized profit opportunities could exist in the economy, but also points toward the perfect knowledge assumption as the key assumption to relax if one is trying to understand the origins of entrepreneurial opportunities. Superficially, it might appear that the production and dissemination of knowledge by itself will produce more of the entrepreneurship that will equilibrate the economy, and while an increase in knowledge will help foster entrepreneurship, the production of knowledge is not by itself an entrepreneurial undertaking. This might appear obvious when stated so plainly, but the new classical models of economic growth, such as those by Lucas (1988) and Romer (1990), emphasize the importance of human capital and the production of technological advances in their growth models, without capturing at all the role of entrepreneurship.

When entrepreneurial opportunities arise, they are not plainly visible for all to see. Rather, as Hayek (1945, 1949) has suggested, all individuals have some knowledge specific to time and place that is not available to others. In many cases, that knowledge is not easily

transferable to others. It may be the ability to recognize certain patterns in market behavior (a simple example would be seasonal patterns), subtle differences in quality of goods, or ways to identify whether resources are being used efficiently. Such knowledge might be acquired by experience, and may be difficult to articulate to others. Thus, certain entrepreneurial opportunities will be more available to some people, while a different set of opportunities will be more available to others. Because the ability to recognize an opportunity will often come only from some specific knowledge of time and place, perfect knowledge, in the sense assumed in the neoclassical model of perfect competition, will never exist.

Kirzner (1973) depicts entrepreneurial insight as the recognition of a profit opportunity that was previously unnoticed, and as such, does not require, or even involve, any outlay of resources on the part of the entrepreneur. In this way, entrepreneurial opportunities are differentiated from mere information, which people can and do seek out. Yet, as Harper (1996) explains, it is possible for people to invest in activities that create a more fertile environment for observing entrepreneurial opportunities. Seeking information, investing in human capital, and systematically searching through promising ideas are not entrepreneurial acts in themselves, as Kirzner defines entrepreneurship, but they can create an environment where entrepreneurial insights are more likely to be generated. Similarly, as Holcombe (1998) explains, research and development activity is not entrepreneurship. But such investment in the advancement of knowledge can create an environment in which entrepreneurial opportunities are more likely to be generated. Furthermore, knowledge is necessary for the entrepreneur to recognize an entrepreneurial opportunity when one appears. There is a direct connection between entrepreneurship and knowledge.

When one looks at the entrepreneurship that occurs in high-tech areas such as medical care, pharmaceuticals, and electronics, it is apparent that entrepreneurial insights are more likely to come to individuals who have an intimate knowledge of the area. It is unlikely that a baker will stumble across a better method for etching circuits in electronic devices, or that an auto mechanic will discover a more effective medication for lowering cholesterol. Of course, the baker and the auto mechanic have their own specific knowledge of time and place, but the point of picking high-tech examples is to illustrate that while entrepreneurship is not directly produced by knowledge, knowledge is a key ingredient in the production of entrepreneurial insights. Without knowledge, how could one recognize whether the opportunity to take some action was likely to result in profit? Furthermore, Harper (1996) notes that marketing research can aid entrepreneurs in identifying the most promising ideas, and tailoring their offerings to more closely fit the actual entrepreneurial opportunity. Henry Ford seized a very profitable opportunity when he began mass-producing automobiles at a cost much less than the other available alternatives, but missed the chance to maintain his lead by not seeing the market for new models and more options for his cars.

Innovation and technological advance are not entrepreneurship. For example, most of the innovations introduced to the market on Macintosh computers, and that later migrated to Microsoft's Windows environment, including the use of on-screen windows and the computer mouse, were developed by Xerox, but the company that produced the innovation failed to capitalize on the entrepreneurial opportunity. At the time that Xerox developed this technology, no other entrepreneur had the opportunity to use it, because nobody else knew about it. However, apparently lacking the entrepreneurial insight, Xerox failed to capitalize

on the entrepreneurial opportunity that only it had, and instead revealed the idea, leading to other entrepreneurs making use of it. In this case, it is easy to separate the innovation and technological advance from the entrepreneurship.

This example illustrates that entrepreneurial opportunities can be divided into two categories. Some opportunities might arise as a result of the innovative activity of the potential entrepreneur, making the innovator the only one who is in a position to observe the existence of the opportunity. The people at Xerox could have, had they been more entrepreneurial, recognized that they had a good idea for a computer interface, and brought a product to market (or sold the idea to another company). As the innovator, they had the first chance to seize the entrepreneurial opportunity from their innovation. Other opportunities arise because people see that the market offers an entrepreneurial opportunity, perhaps as simple as buying something cheaply in one location and selling for more elsewhere, or perhaps as complex as buying inputs, combining them in a new manufacturing process, and selling a new product for a profit. The first type of opportunity is open only to the innovator, because nobody else is in a position to observe the innovation, whereas the second type of opportunity is open to anyone, because it relies only on seeing an unexploited market using generally available information.

Entrepreneurship, as described by Kirzner (1973) is more in the spirit of the second type of activity. For it to take place, however, there must be a market in which the profit opportunity can be realized. The first type of entrepreneurship, resulting from innovation undertaken as a private activity, also depends on a market. Partly, this is because the innovation cannot be capitalized upon without a market (in the case of Xerox, they did not even recognize the market value of their innovation, but others did), and partly this is because there is little incentive to invest in innovative activity unless, eventually, there is a way for the activity to generate a return to finance it. Thus, Harper (1996) emphasizes the close connection between the advance of knowledge and the production of entrepreneurial activity, and emphasizes that when entrepreneurship can be profitable, people have the incentive to invest in the advance of knowledge, which eventually can produce a payoff if it produces entrepreneurial opportunities. The production of knowledge is not entrepreneurship, but the two are closely linked.

The Origin of Entrepreneurial Opportunities

The information needed to seize some entrepreneurial opportunities comes from sources available in principle to everyone, although recognizing that information that a person acquires constitutes an entrepreneurial opportunity may also require some specific knowledge of time and place. For example, Ray Kroc turned Macdonalds into a global fast food empire by buying an existing restaurant started by someone else, and recognizing its potential, expanding into new markets. Many people had the same information Ray Kroc had, but Kroc was the one with the entrepreneurial insight, built partly on his experience in the restaurant industry. Other times the information is not generally available. This will be the case with most private research and development. But as already noted, technological advance is not entrepreneurship. Entrepreneurship is a market activity, that arises solely within the context of markets. A profitable opportunity is spotted by an entrepreneur, and acted upon.

The next several sections of the paper provide a taxonomy of the origins of these market opportunities. Regardless of whether the information about an opportunity is privately held or more generally available, entrepreneurial opportunities arise from three general sources. First, they can come from factors that disequilibrate the market. Second, they can come from factors that enhance production possibilities. Third, they can come from the activities of other entrepreneurs. This paper will argue that the third factor is the most important. Past entrepreneurship is the most significant source of future entrepreneurial opportunities.

Factors that Disequilibrate the Market

Kirzner's emphasis on the equilibrating function of entrepreneurship naturally focuses attention on factors that disequilibrate the market. The very notion of equilibrium suggests an economy that will continue on its present path undisturbed until it is shocked out of equilibrium. Then the equilibrating forces of the market take over to put the economy back on its equilibrium path. A number of factors could disequilibrate the market. For example, preferences could change, requiring resources to be reallocated to conform to the new pattern of preferences. Stigler and Becker (1977) question any economic analysis that is based on preference changes, and with good reason, because what appear to be preference changes are likely to be a response to changes in the environment, relative prices, wealth, or some other observable factor. Nevertheless, autonomous preference changes remain a possible disequilibrating force.

Other factors might be related to the environment within which production occurs. Farm production is affected by the weather, so that floods or draughts might lower farm output, and particularly good weather can raise it. Similarly, natural resources can be depleted, so that as oil wells run dry, continued production of oil is dependent upon the discovery of new reserves, which is an ongoing process. As landfills reach their capacity, new sites (or disposal methods) must be found. Thus, many factors can push an economy away from equilibrium, producing entrepreneurial opportunities. Despite the fact that the impending push away from the current steady state can often be foreseen, it is not always obvious what actions are appropriate to reequilibrate the economy. One can foresee an oil well becoming exhausted or a landfill reaching capacity, but that does not make it obvious where the next landfill will be, or where new discoveries of oil, or substitutes for oil, can be made. Therefore, factors that disequilibrate the market call for entrepreneurship.

Entrepreneurial activities that respond to disequilibrating forces are vital to preserving the status quo, thus are vital to the continued operation of the market. Yet taking a longer view, entrepreneurship results in much more than just maintenance of the status quo. When one thinks of entrepreneurs like Henry Ford, or Ray Kroc, or Bill Gates, one can see that entrepreneurship plays a crucial role in enhancing the status quo.

Factors that Enhance Production Possibilities

Some entrepreneurial opportunities arise as a result of factors that enhance production possibilities. Some factors that enhance production possibilities might also disequilibrate the

market, if they are unanticipated, and the discussion of the previous section would apply. Other times, factors that enhance production possibilities are anticipated. An example is Moore's law, named after Gordon Moore, one of the co-founders of Intel. Moore's law states that the power of microprocessors will double every 18 months, and has held approximately true for two decades. Whether Moore's law will continue to hold is irrelevant for present purposes. In the computer industry, and in other industries, advances in production technologies are often anticipated, and are consistent with an equilibrium in which everyone's plans are mutually compatible.⁶ In fact, one can imagine a situation in which anticipated enhancements in production possibilities were not realized, leading to a disequilibrium because people made their plans based on anticipated technological advances. Enhancements to production possibilities may be disequilibrating, but when they are anticipated, they need not be.

Within the neoclassical production function approach to examining productivity, one might view output as a function of capital and labor, so $Q = f(K, L)$. This approach immediately leads one to see that output can be increased if there is an increase in capital or labor, or if the production function changes form so that more output can be produced with a given amount of capital and labor. Changes in the production function are often the result of entrepreneurial activity itself, so will be discussed in more detail in the next section. In neoclassical models, this has led primarily to a focus on research and development as a method of enhancing production possibilities. Exactly how research and development yields greater output is a bit of a mystery, both in the model and in the real world. Sometimes substantial expenditures are undertaken with little or no payoff, while at other times the simplest discovery can yield great returns.

The role of capital and labor in the production function are more clear. But this production function approach conceals the fact that if more capital and labor are available, they may be used in new and innovative ways, so a doubling of inputs may lead to more than a doubling of output. This can be "modeled" by depicting a production function with increasing returns to scale, but the model does not depict the essential fact that increasing returns to scale must imply using inputs differently depending upon the quantity of inputs available. The ability to use inputs differently, because more inputs are available, requires entrepreneurial insight. While it is relatively easy to envision increasing output by using more inputs to do the same thing, it requires some insight and imagination to see that with more inputs, there is a more efficient way of undertaking an activity.

A good example is Henry Ford's adoption of the assembly line to manufacture automobiles early in the twentieth century. As the demand for automobiles increased, more workers and more tools could have been purchased, and if any management and coordination problems could be avoided, a doubling of inputs could have produced a doubling of output. Entrepreneur Henry Ford envisioned that with more labor and capital, the inputs could be used in a different type of production process, increasing output more than in proportion to the increase in inputs. This entrepreneurial insight falls outside the model when taking a neoclassical production function approach.

The production function approach also conceals the fact that an increase in capital or labor could just be more people or more machines, or could be an increase in the quality of the inputs, quantity held constant. Thus, growth models using a production function like

the one above have sometimes divided through by L to find that Q/L , output per capita, is then a function of capital and the technology available for production, leaving labor out of the picture altogether. Economists now understand the problem with this approach, and understand that L is more than just bodies, it also encompasses human capital. Thus, L can be increased through education, training, and even cultural norms (like showing up for work on time). When the quality of the labor force increases, or when the quality of the capital stock increases, that opens entrepreneurial opportunities to do things differently. To do so, however, requires someone with the insight to observe that with increases in inputs, a new process could be instituted that would result in more output from a given amount of inputs. This is a major source of increasing returns to scale.

Increases in output by themselves generate entrepreneurial opportunities. The aggregate production function approach conceals the fact that if more output is available, consumers will not want the same mix of output. Even when many different outputs are depicted in economic models, it is common to use some sort of homothetic utility function (such as Cobb-Douglas or CES) for modeling simplicity, which assumes that when relative prices are unchanged, consumers will desire the same mix of outputs at any level of income. In an economy that produces many goods and services, it is implausible to think that a doubling of output would result in exactly twice as much of all existing goods and services. As less developed economies increase their incomes, more automobiles are demanded relative to bicycles, and less income is devoted to food relative to other goods. The changing mix of goods and services as income grows also produces entrepreneurial opportunities.

Adam Smith began his *Wealth of Nations* with the key insight that the division of labor is limited by the extent of the market. He explained that increasing specialization in production led to increased productivity, but that the potential for increases in output due to increased specialization was limited by the extent of the market. Thus, one of the key factors producing entrepreneurial opportunities is an expansion in the extent of the market. The market can be extended through population growth, increases in per capita income, and by reductions in transportation and communication costs. Each of these factors increases the potential market for producers in any given location, and allows an increased division of labor.

It is easy to see how much more specialized retailers are in big cities relative to smaller towns. The variety of restaurants, shops, and other services is apparent. The variety of specialized business services is so much greater that many businesses would have trouble operating outside of a major city. Reductions in transportation and communications costs are making such services available to a wider market, however. One example is the proliferation of nationwide financial services firms (such as stock brokers) who rely on long distance telephone communication to stay close to their customers. Such services that are common in the 1990s would not have been financially viable in the 1950s only because communications costs were so much higher. Similarly, roadway improvements and the lower cost of air freight has extended the market for many firms. Some firms, like Federal Express, seized an entrepreneurial opportunity to extend the market, and this allowed other firms a larger market, which then allowed them to increase their division of labor and increase their productivity.

When production possibilities increase, entrepreneurial opportunities are created in several ways. More inputs, including increases in the quality of physical and human capital,

allow inputs to be combined in new ways. Income growth opens the possibility of marketing new goods, or expanding the market for goods that are income-elastic. Undertaking such activities requires the entrepreneurial insight to see that there are profits to be made from changing the way one does things. As the extent of the market increases there are entrepreneurial opportunities to increase the division of labor, but again, such changes only take place as a result of an entrepreneurial insight that the changes have the potential to be profitable. Thus, increases in production possibilities provides an important source of entrepreneurial opportunity.

Entrepreneurial Activity as a Source of Entrepreneurial Opportunity

As important as factors that disequilibrate the market and factors that enhance production possibilities are to the production of entrepreneurial opportunities, the most important source of entrepreneurial opportunities is the activity of other entrepreneurs. When an entrepreneur takes advantage of a previously unnoticed profit opportunity, this creates new profit opportunities, allowing other entrepreneurs to act, and the process continues cascading through the economy creating additional profit opportunities. The process of entrepreneurship itself is the most common source of new entrepreneurial opportunities.

Kirzner (1973) depicted entrepreneurship as the recognition of previously unnoticed profit opportunities, and emphasized, in contrast to Schumpeter (1934), the equilibrating nature of entrepreneurship. Kirzner focused on how entrepreneurial activity exploited previously unrecognized profit opportunities to pull the economy toward equilibrium, rather than considering how these profit opportunities had been created, or why they had gone unrecognized. In fact, most profit opportunities had not been previously recognized because they were relatively new, and once created, they were rapidly exploited. By filling in the details about how profit opportunities are created, Kirzner's story becomes more complete. Kirzner described the process of entrepreneurship in response to those entrepreneurial opportunities that had not yet been noticed, and this paper complements Kirzner's story by describing the origins of those entrepreneurial opportunities. Because most entrepreneurial opportunities are created by the actions of entrepreneurs, the same theory of entrepreneurship explains both the origins of entrepreneurial activity and the way in which entrepreneurs act on available opportunities.

If one concentrates only on the response of entrepreneurs to a stock of entrepreneurial opportunities, it appears as if there is a pool of opportunities from which entrepreneurs can draw, but as entrepreneurs act, the remaining number of entrepreneurial opportunities is reduced as the economy approaches equilibrium, and at equilibrium all of the entrepreneurial opportunities have already been exploited. Looked at in this way, the more entrepreneurial activity there is, the fewer entrepreneurial opportunities will be available. However, just the opposite is true. Each entrepreneurial action creates more entrepreneurial opportunities, increasing the pool of entrepreneurial opportunities as entrepreneurship takes place.

Mancur Olson (1996), in a paper titled "Big Bills Left on the Sidewalk," argues that people just do not pass by easily exploited profit opportunities. Olson is considering why some economies grow more rapidly than others, but he makes the important point that when the incentives are right, profit opportunities do not remain unexploited long. If Olson is right,

continuing entrepreneurial activity requires a continuing source of new entrepreneurial opportunities, and the key point of this section is that those new opportunities are created by entrepreneurs as they exploit existing opportunities.

In one way, this positive feedback mechanism where entrepreneurship creates additional entrepreneurial opportunities might be viewed as a kind of network externality, as discussed by Bygrave and Minniti (2000). Bygrave and Minniti focus on the way that the culture of entrepreneurship can spread, which is undoubtedly correct, but as this section notes, independent of any cultural effects (such as some entrepreneurs serving as role models for others) or community characteristics that might make people more likely to act entrepreneurially, entrepreneurial actions simply produce more entrepreneurial opportunities that will then be available to be exploited. Independent of any network effects, entrepreneurial actions create more entrepreneurial opportunities. Network effects work in the same direction, however, so the effects of entrepreneurship discussed in this section are reinforced by the network effects insightfully modeled by Bygrave and Minniti.

To see how entrepreneurship can create additional entrepreneurial opportunities, consider an example in one of the most entrepreneurial industries at the end of the twentieth century: microcomputers. Somebody had the idea that rather than have the microcomputer mouse tethered to the computer with a cord, the mouse could transmit an infrared signal to the computer, enabling the mouse to be wireless. Why had nobody acted on this entrepreneurial opportunity before? The answer is that it had not existed very long before it was exploited. The opportunity had not been lying in wait for decades; rather, shortly after the mouse became a popular input device for computers, this opportunity was observed and acted on. The opportunity was created by the development of the computer mouse, itself an earlier act of entrepreneurship, and computer users know that pointing sticks, trackballs, and touchpads are other input devices developed by entrepreneurs. But this particular pool of entrepreneurial opportunities only existed after the development of the mouse as an input device. The entrepreneurial activity of the developer of the mouse did not use up an entrepreneurial opportunity, it created many more entrepreneurial opportunities.

Similarly, the mouse was not an opportunity that went unnoticed for long either. Computer mice came into widespread use shortly after microcomputers became powerful enough to use them as input devices, so the entrepreneur who developed the mouse was building on an opportunity that was the product of the entrepreneurs who developed the microcomputer. Without microcomputers the opportunity to profit from the sale of mice would not exist. The more complete story is slightly more complex, but shows again how the entrepreneurial actions of some produce opportunities for others. The mouse was actually developed by Xerox, but Steve Jobs at Apple Computer recognized the potential of the input device and popularized it. Then, seeing how well the device worked, Bill Gates at Microsoft built an operating system using the idea, and became the richest man in the world. But there would have been no opportunity to develop the infrared mouse (and touch pad and pointing stick and track ball) had the mouse not first been developed as an input device. In turn, this entrepreneurial act depended upon entrepreneurs seeing that microprocessors could be used as the basis for microcomputers, an entrepreneurial discovery that could not have taken place without the invention of the microprocessor. And that entrepreneurial act could not have occurred without the invention of the transistor. The example illustrates the idea

that entrepreneurs do not use up entrepreneurial opportunities, they create them. One act of entrepreneurship creates many more entrepreneurial opportunities.

One can analyze a single act of entrepreneurship, but to do so overlooks the cumulative nature of the ongoing process of entrepreneurship in the economy. In an economy that is relatively stagnant, or in a model in which the economy is in equilibrium, there are little or no entrepreneurial opportunities to be exploited. With little in the way of entrepreneurship, few new opportunities are being added to the pool, and it does not pay to be very entrepreneurial. Omniscient observers can tell real profit opportunities from apparent opportunities that look better than they really are, but in the real world entrepreneurs may take losses as a result of erroneously perceiving what appeared to be an opportunity. When few opportunities exist, the chances of being wrong increase, and entrepreneurial activity will be almost nonexistent. On the other hand, when there is much entrepreneurial activity, many new opportunities are being added to the pool, and entrepreneurial activity is more likely to pay off, creating an incentive to be more entrepreneurial.

Entrepreneurship is an integral part of the process of economic growth, as Holcombe (1998) explains, but when considering the origins of entrepreneurial opportunities, growth and past entrepreneurship differ in important ways. Growth creates entrepreneurial opportunities by changing the type and mix of output demanded, and creating the opportunity to take advantage of scale economies. These opportunities are exogenous to the entrepreneurial process, and are eliminated as entrepreneurs act on them. Entrepreneurial opportunities created by entrepreneurship change the nature of the production process, so generate additional entrepreneurial opportunities, making them an endogenous process that produces continuing growth.

The Environment of Entrepreneurship

Entrepreneurship begins with the observation of a previously unnoticed profit opportunity, but as the previous section has shown, profit opportunities are just not waiting for the ordinary person to observe and act upon. Once the opportunity is created, typically it is acted on rapidly, by those who are in the proximity of the opportunity. It makes sense, for example, that those working in the computer industry are the people most likely to observe an opportunity in that industry. As Hayek (1945) noted, everyone has knowledge specific to their own activities, and the economy will be most productive when the economic system gives everyone an incentive to act on the specific knowledge they possess. Hayek stressed the advantages of a market economy, which allows individuals to act on their own specific knowledge of time and place, and also provides the incentive, in the form of entrepreneurial profits, to act entrepreneurially. Entrepreneurial activity depends to a large degree on allowing entrepreneurs to keep the profits from their entrepreneurial actions. This is well-recognized. Entrepreneurs also respond to the availability of entrepreneurial opportunities. The more opportunities available, the more alert entrepreneurs will be toward finding them.

Noticing an entrepreneurial opportunity might be compared to finding money on the sidewalk. A person walks by and is alert to the fact that the money is there, and picks it up and profits from it. Few people keep a vigilant lookout for money on the sidewalk, for the

simple reason that there is not much lying about to be picked up. If finding money on the sidewalk were a more frequent occurrence, surely people would be walking with their eyes down, more alert to the opportunity. So it is with entrepreneurship. The entrepreneur notices an opportunity nobody else has seen before, but often it is because the entrepreneur is trying to be alert to upcoming opportunities. And like the money on the sidewalk, entrepreneurial opportunities do not lie around for long before they are picked up by someone. Here the analogy stops, however. Once the money is gone, nobody else has the opportunity to find it. However, when an entrepreneur acts, more entrepreneurial opportunities are created, making it more likely that one can find a profitable opportunity by following in the tracks of other entrepreneurs. Entrepreneurship creates more opportunities and gives potential entrepreneurs more of an incentive to look for them.

People rarely search the sidewalks in hope of uncovering treasure, but it is not uncommon to see people methodically scavenging on a beach, perhaps with metal detectors, because finding valuable lost objects on the beach is a more common occurrence than finding items on the sidewalk. Similarly, entrepreneurs more actively seek new profit opportunities in the computer industry than in textiles, because opportunities are more likely to be found there. In Kirznerian fashion the entrepreneur stumbles upon a previously unnoticed profit opportunity, but as Harper (1996) notes, successful entrepreneurs are often trying to be alert to opportunities. In the Kirznerian framework, there is a key distinction to be made between trying to be alert to entrepreneurial activities, which is really a type of search behavior, and entrepreneurial acts themselves. Potential entrepreneurs can engage in search activities in order to increase the probability that they will come upon an entrepreneurial opportunity. In an environment where opportunities frequently arise, remaining alert is profitable, which gives people an incentive to search for and be alert to entrepreneurial opportunities, and creates more entrepreneurial alertness.

Because entrepreneurial activity is the most common source of entrepreneurial opportunities, entrepreneurship tends to be clustered. Certain industries are more entrepreneurial than others, as are certain geographic areas and certain nations. Entrepreneurship creates an environment where more entrepreneurship can thrive. Silicon valley in California provides an example where entrepreneurship is clustered as some entrepreneurs remain on the lookout for opportunities created by past entrepreneurial acts. If past entrepreneurship used up opportunities rather than creating them, one would expect the most promising opportunities to lie far afield from recent entrepreneurial successes.

This view of entrepreneurship as the creator of entrepreneurial opportunities completes Kirzner's model of entrepreneurship. Kirzner focuses on how entrepreneurs respond to entrepreneurial opportunities, and this paper explains how entrepreneurial opportunities arise as a result of the actions of entrepreneurs themselves. The act of entrepreneurship creates more entrepreneurial opportunities, initiating a perpetual process of entrepreneurial discovery.

The Role of R&D in the Entrepreneurial Environment

Kirzner's entrepreneurs happen upon entrepreneurial opportunities that have not yet been noticed by others. This entrepreneurial act uses no resources, and requires no investment. The

entrepreneur is simply alert enough to notice something that has not been noticed previously. However, as the previous section observed, people will be more alert to entrepreneurial opportunities when they are more readily available.⁷ Furthermore, they may be able to produce an environment themselves where entrepreneurial discoveries are more likely to be made. This is the role of research and development.

Research and development does not by itself produce entrepreneurial opportunities, but it does produce an environment in which profit opportunities are more likely to exist. Thus, by undertaking research and development, individuals are more likely to find themselves in an environment where entrepreneurial insights can occur. This does not have to be the case. Consider two examples. The former Soviet Union, perhaps taking neoclassical growth models too seriously, invested heavily in research and development, as well as physical and human capital, which are the inputs that should produce economic growth. Yet their R&D did not lead to growth, because despite the technical advances that were made, there was not the economic environment that allowed those advances to be employed entrepreneurially. To draw on a previously used example, the fundamental building blocks of the Apple Macintosh computer, including the use of windows and the use of a mouse, were developed by Xerox, which totally failed to capitalize on them. Had Xerox been in the Soviet Union, its R&D efforts would have been wasted. However, in the United States, entrepreneurs from another company were able to seize the entrepreneurial opportunities created by the first.

These examples show that research and development is not entrepreneurship and does not necessarily lead to entrepreneurial insights. It can, however, produce an environment within which entrepreneurial opportunities are more likely to be discovered. As noted earlier, and as emphasized by Harper (1996), the growth of entrepreneurial opportunities is intimately connected with the growth of knowledge, so generating new knowledge can increase the possibility of finding entrepreneurial opportunities. Furthermore, if a firm has its own proprietary R&D activities, it can search an environment likely to have entrepreneurial opportunities to which nobody else has access. Entrepreneurship cannot be produced, but an environment within which entrepreneurial discoveries are more likely can.

The argument is sometimes made that research and development should be subsidized, because the resulting knowledge that is produced is a public good.⁸ Thus, the argument goes, there will be underinvestment in the production of knowledge, and when knowledge is produced, it will be underutilized for two reasons. First, if it is covered by patents or copyrights, its availability will be restricted by the monopoly power conveyed by the producer of the knowledge. Second, if it is privately produced, those who have the knowledge have an incentive to withhold it from others who could use it profitably, in order to reap the benefits themselves. Thus, the optimal policy is to undertake R&D with public funds, and make the knowledge produced through R&D freely available to the public. These arguments apply to the products of research and development, once the research has been done, but treat research output as if it is a free good. As the section above noted, there is an incentive to engage in research activities to further the state of knowledge because it creates an environment that produces potential entrepreneurial opportunities. If the activity were subsidized, the researchers would have less incentive to undertake those research projects most likely to lead in the direction of welfare-enhancing innovation.

The argument against subsidization is that private activity provides the incentive to create an environment most likely to lead to profit opportunities, as opposed to merely engaging in the interests of the researchers themselves. The arguments favoring subsidization contain the implicit assumption that the same research activities would occur whether they were done privately and produced proprietary results, or whether the subsidized research results were available to all. But there is no reason to think that subsidized research and development will resemble privately financed R&D, any more than the consumer products of the former Soviet Union resembled consumer products in the United States.

Subsidies to some research do not necessarily prevent others from engaging in their own independent research, but subsidies do take away from some of the profit potential of non-subsidized research. If there is the chance that insights could be produced first by a subsidized operation, that reduces the incentive to engage in unsubsidized research, even if the unsubsidized research is likely to be more productive. Furthermore, if research in an area is subsidized, potential entrepreneurs might free ride off the subsidized research, waiting to see what the subsidized research produces rather than engaging in their own independent research. When one views research and development as an activity that creates an environment conducive to entrepreneurship, rather than an activity that produces technical advances, the argument for subsidization fares badly. Thus, the distinction made earlier between knowledge and entrepreneurship has important policy implications. A theory of economic growth based on technological advances will look upon subsidized research and development more favorably than a theory of economic growth based on entrepreneurship.

Arbitrage Versus Production

The surest way for an entrepreneur to make profits is through arbitrage. If an entrepreneur notices that a seller is willing to sell a good for less than a buyer is willing to pay for it, the entrepreneur can buy it from the seller, and sell it to the buyer, reaping a profit, making both the buyer and the seller better off as a result. Such arbitrage profits are easy to notice, tend to be small, and tend to be rapidly competed away. Nevertheless, especially in financial markets, arbitrageurs are able to make steady, and occasionally spectacular, profits. Most entrepreneurial opportunities involve production and time, however, and these two elements mean that when an entrepreneur acts on an entrepreneurial insight, the entrepreneur's profit is not a sure thing.

Entrepreneurs may be able to sell their insights, leaving them with pure profit and leaving another business entity to bear the risk, but even this is hard to do because there is not a well-developed market. Perhaps a part of a business manager's salary will be based on the production of entrepreneurial insights, leaving the manager with a positive salary even if the insight does not pan out. Similarly, consultants may sell only their ideas, but when they are affiliated with consulting firms that hire employees and have other expenses, they leave the realm of pure entrepreneurship and accept business risks themselves. Entrepreneurial insights involving production and time are difficult to sell because often people other than the entrepreneur will not recognize the opportunity even when it is pointed out to them. The founders of Apple Computer tried to sell their idea to established computer firms, none of whom recognized the entrepreneurial insight even when it was shown to them. The

entrepreneurs started their own company because it was the only way they could capitalize on their insight.

A pure arbitrage profit is available if an entrepreneur notices that a seller will sell a good for less than a buyer will pay for it. However, if the seller is in one location and the buyer is in another, the entrepreneur must make sure that the difference between the seller's asking price and the buyer's bid is sufficient to cover transportation costs. Similarly, if it takes time to transport the good from the buyer to the seller, there is a temporal element also, and the entrepreneur must speculate (perhaps writing a contract to be more sure) that the buyer will pay more tomorrow than what the seller is willing to sell for today. When the entrepreneurial insight involves production, profit is no longer a sure thing. The uncertainties become greater if the entrepreneurial insight involves hiring employees, designing and building (or growing) a product, borrowing money to finance the activity, and so forth. When production is involved, even when the production is only transporting a good, or when time is involved, there is a risk that what appears to be a profit opportunity might actually not be profitable.

The risk involved in production is very relevant to the environment within which entrepreneurship takes place. In an environment with little entrepreneurship, entrepreneurial insights are less likely to pan out and be profitable. Consider an economy in a steady state general equilibrium. It is possible that an overlooked profit opportunity exists, but more likely, any perceived opportunity will turn out to cost more than at first appears to be the case, or will return less revenue. Thus, potential entrepreneurs have good reason to be cautious, and potential entrepreneurial opportunities may go unnoticed because nobody has an incentive to look for them. When there is a great deal of entrepreneurial activity, however, new opportunities are being produced all the time, and it pays to be alert, and to act quickly before a competing entrepreneur takes the opportunity. Entrepreneurial opportunities are, in one sense, just lying around waiting to be discovered, but they are more likely to remain unnoticed in an environment where there is little entrepreneurship to begin with.

Institutions and Entrepreneurship

One can see, from a theoretical standpoint, that when markets are disequilibrated, when production possibilities are enhanced, and when the economy already has a substantial amount of entrepreneurship, the economic environment is conducive to continuing entrepreneurial activity. An important policy question then becomes, how can an environment in which entrepreneurship thrives be created? In response to the neoclassical theory of economic development that has emphasized investment and technological advances, with poor results,⁹ economists have recently developed an increasing interest in trying to understand how economic policy can create an environment conducive to entrepreneurship and economic progress.

Scully (1988, 1992) has noted the importance of free markets in the creation of an environment conducive to economic growth, and Barro (1996) argues that it is the protection of economic freedom rather than democracy and political freedom that creates a productive economic environment. In a comprehensive empirical examination of the issue, Gwartney, Lawson, and Block (1996) relate economic freedom to economic growth, and identify those

particular market institutions that appear most closely associated with economic growth. Along the same lines, Gwartney, Lawson, and Holcombe (1999) show the close relationship between market institutions and economic growth, holding constant factors such as human and physical capital, and political institutions. These examples are representative of an extensive literature on the importance of market institutions to the production of economic growth. A complete discussion of the institutional factors that create an environment conducive to entrepreneurship would require another paper, and is somewhat peripheral to the subject of this paper. The key point for present purposes is that market institutions are important because without them, the environment within which entrepreneurship takes place is missing.

Entrepreneurship is a key ingredient to a prosperous economy, and while this requires a vibrant private sector, government policies can have a major effect on the amount of entrepreneurship that takes place. Government can encourage entrepreneurship by providing a stable economic environment and by protecting property rights. Market institutions are vital as a foundation for entrepreneurial activity, and excessive government interference through taxation, regulation, and redistribution, can kill the incentives for entrepreneurship. If one takes a production function approach to the economy, it appears that the route to prosperity is through increasing inputs, requiring investment and technological advances. This approach ignores the entrepreneurial role involved in combining inputs most effectively.

Entrepreneurship involves noticing previously unexploited profit opportunities, and is not so amenable to mathematical modeling as the relationship between inputs and outputs. Yet over the long run it is much more important to nurture entrepreneurship than it is for public policy to encourage investment. An economic environment conducive to entrepreneurship provides private incentives to invest in human and physical capital, and to make technological advances, without any explicit policy. Investment and productivity increases follow automatically in an environment that allows entrepreneurship to thrive. Entrepreneurial acts have a certain amount of mystery surrounding them. (How did somebody come up with that idea?) But creating an environment within which entrepreneurship thrives is not a mystery. Stable market institutions are the key.

Conclusion

Kirzner's theory of entrepreneurship focuses on the way in which entrepreneurial discovery reallocates resources, and on the role of entrepreneurship on equilibrating markets. Kirzner has little to say about where those entrepreneurial opportunities come from that allow entrepreneurial activity to take place. Because Kirzner does not discuss it, one could envision there being a fixed stock of entrepreneurial opportunities, and as entrepreneurs discover and take advantage of them, the opportunities for future entrepreneurship are diminished. In fact, the opposite is true. Entrepreneurial discoveries lead to more entrepreneurial opportunities, so the more entrepreneurship there is in an economy, the greater will be opportunities for future entrepreneurship.

There are three basic sources of entrepreneurial opportunities: factors that disequilibrate markets, factors that enhance production possibilities, and the effects of entrepreneurial activities themselves. Disequilibrating factors can be easily understood within a neoclassical

general equilibrium framework. Changes in tastes, technologies, or available resources push the economy out of equilibrium and create profit opportunities for those who reallocate resources. Market economies typically remain close to equilibrium precisely because entrepreneurship reallocates resources in a stabilizing way. This is one of the important lessons Kirzner (1973) emphasizes. Factors that enhance production possibilities imply a reallocation of resources because the mix of goods and services demanded will change as income grows, and because an increase in the extent of the market will make different production techniques more profitable. This is not so apparent in a general equilibrium context because general equilibrium models often employ homothetic utility and production functions. Even when models allow increasing returns to scale, the models do not make it apparent that entrepreneurial activity is necessary to increase output more than in direct proportion to an increase in inputs. Thus, the models overlook changes in the mix of outputs and overlook the fact that more efficient production techniques can be used as markets grow. The most important factor creating entrepreneurial opportunities, however, is the act of entrepreneurship itself.

When an entrepreneur seizes on a new entrepreneurial opportunity, new market possibilities are created. If an entrepreneur creates a new product, that creates the possibility of complementary products and increases the demand for inputs into the new product (but also may reduce the demand for other goods). If an entrepreneur discovers a better process for producing an existing product, this also creates opportunities for potential input suppliers. Thus, there is not a stock of entrepreneurial opportunities that can be used up as entrepreneurs take them; rather, when entrepreneurs act on one opportunity they create additional entrepreneurial opportunities, so the more entrepreneurship there is in an economy, the more entrepreneurial opportunities will be available for others. Entrepreneurship leads to more entrepreneurship.

Entrepreneurship cannot be produced in the same way that capital goods can, but it is possible for potential entrepreneurs to create an environment within which entrepreneurial discovery is more likely. Research and development is not the same thing as entrepreneurship, but by investing in research and development, businesses can create an environment conducive to entrepreneurial discovery.

Because entrepreneurs discover previously unexploited profit opportunities, entrepreneurship is more likely within an institutional framework that makes profit opportunities easy to spot. The first prerequisite is the opportunity to make a profit. If high taxes or excessive regulation make profits unlikely, there is little incentive to act on entrepreneurial opportunities. Furthermore, if the price level is erratic and unstable, prices will not convey as much information, making it more difficult for entrepreneurs to differentiate genuine profit opportunities from price discrepancies caused by inflation. Thus, a free market institutional structure is an important prerequisite to entrepreneurial activity.

An understanding of the origins of entrepreneurial opportunities is important in its own right, as a guideline for creating economic policies that will lead to prosperity. From an academic standpoint, an inquiry into the origins of entrepreneurial opportunities helps to develop Kirzner's theory of entrepreneurship. Kirzner focused on the actions entrepreneurs take in response to entrepreneurial opportunities. By showing that those entrepreneurial

actions themselves are the primary cause of new entrepreneurial opportunities, Kirzner's theory of entrepreneurship becomes more complete.

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Notes

1. This idea is discussed further in Holcombe (1999).
2. While equilibrium models do dominate economics, there has been an increased interest in institutions and market processes in the last decades of the twentieth century. For an interesting discussion and taxonomy, see Williamson (1990).
3. Kirzner (1999) departs slightly from his emphasis on the equilibrating role of entrepreneurship to incorporate the possibility of Schumpeterian disequilibrating entrepreneurial actions.
4. This distinction is discussed at greater length by Boudreaux and Holcombe (1989).
5. Ferguson (1969:224), a good reference for the neoclassical framework, outlines the assumptions for the competitive model, saying, "Consumers, producers, and resource owners must possess perfect knowledge if a market is to be perfectly competitive." There is some ambiguity here, because Ferguson appears to be using the term knowledge to refer to information, and is suggesting that competition requires that any information known by some people must be known to everyone. Knowledge might also refer to the expertise that allows some people to gain from information that is available to all. This section uses this broader concept of knowledge.
6. Lewin (1997) discusses change within the context of economic equilibrium, and explores the notion that equilibrium can be defined as a situation in which everybody's plans are compatible.
7. Schiller and Crewson (1997) note that while it is difficult to identify a set of people who are entrepreneurs, there may be a strong correlation between self-employed individuals and entrepreneurs. Examining those who are self-employed, they find that many people are self-employed for a period, but that most return to working for someone else, suggesting a high failure rate among those who attempt entrepreneurship. Furthermore, they find that the self-employed earn lower incomes than average, suggesting a low average return to entrepreneurship.
8. However, Holcombe (1997) questions the idea that the existence of public goods, as defined by neoclassical economics, results in any economic inefficiencies that can be overcome by government intervention.
9. Krueger (1993) is critical of the growth and development theory that has led development policy to emphasize central planning over the encouragement of market activity.

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