ENTREPRENEURSHIP AND ECONOMIC GROWTH: REPLY

RANDALL G. HOLCOMBE

Frank Shostak and Jörg Guido Hülsmann have written thoughtful comments on my article, "Entrepreneurship and Economic Growth" (1998). In some places, I agree with them but believe clarification is worthwhile, and in other places I find myself in disagreement. Despite the fact that we do not always agree, I appreciate their interest in the issues. The relationship between entrepreneurship and economic growth is an important one, and one that Austrian economic analysis has much to offer. Thus, with my comments below I hope not to have the last word, but to encourage Shostak, Hülsmann, and others to further apply Austrian insights to the topic of economic growth.

KIRZNERIAN ENTREPRENEURSHIP AND GROWTH

Shostak devotes a substantial portion of his comment to a critique of Kirzner's theory of entrepreneurship. I will not defend Kirzner's ideas here, partly because Kirzner can defend his own ideas, and partly because I too think of entrepreneurship more broadly than Kirzner. That said, there are two reasons why I focus on Kirzner's concept of entrepreneurship specifically. First, many of my own ideas developed from my reading of Kirzner. I admire both Professor Kirzner himself and his work, and want to give credit where credit is due. Second, Kirzner's ideas are well-known, and I believe that I have something substantial to add to them. By working in a Kirznerian framework, I can start with a foundation that will be familiar to many readers. Kirzner's analysis starts in an environment where entrepreneurial opportunities already exist, and he discusses the entrenrepeurial role of discovering these opportunities. My article shows that entrepreneurship itself creates new entrepreneurial opportunities, thus serving the dual function of (1) making Kirzner's model more complete by explaining one origin of entrepreneurial opportunity, and (2) creating out of Kirzner's theory of entrepreneurship a theory of economic growth.

SAVING, INVESTMENT, AND GROWTH

Shostak argues, "Irrespective of the complexity and sophistication of the production structure, without an expansion in the pool of saved means of sustenance no economic growth can occur" (p. 70). He cites Mises to suggest that the only way

RANDALL G. HOLCOMBE is DeVoe Moore professor of economics at Florida State University.

The Quarterly Journal of Austrian Economics vol. 2, no. 2 (Summer 1999): 73–78

for economic growth to occur is for saving to increase so that the structure of production can be lengthened. Without taking issue with his interpretation of Mises, Shostak's idea that the structure of production must be lengthened, or more capital must be invested, for growth to occur is wrong.[1] Of course, investment and lengthening the structure of production can lead to growth, but entrepreneurial insights that find ways to reduce the amount of capital necessary for production, and to shorten the structure of production, can also promote growth by reducing the time and resources required in production.

A good example of this is the adoption of "just in time" production, where rather than holding an inventory of inputs into the production process, the flow of inputs is managed so that they arrive just in time for their use. By adopting just in time production techniques, the amount of investment in inventory is reduced, as is the amount of investment required for physical storage of inventory waiting to be used. The implementation of this entrepreneurial insight reduces the amount of investment required to produce output and, even more in line with the temporal nature of Austrian capital theory, actually shortens the time between stages of production. In this example, productivity increases by reducing the amount of capital used, and by shortening the structure of production, contrary to Shostak's assertion. One might argue that the structure of production refers to stages of production rather than calendar time. But as Lewin (1996) notes, some producers have reduced costs by selling directly, eliminating the distributor or middle-man, which obviously eliminates a complete stage in the structure of production. Reflecting on some examples shows that growth can occur without additional saving, but also suggests that the relationships between capital, entrepreneurship, investment, and growth are fruitful areas for further research.

Additional examples range from the obvious to the subtle. Some corporations that formerly had offices for employees who traveled often found that most days, most of their offices were unoccupied. In response, they eliminated permanent office assignments and assigned offices to employees only on days when they actually were at the office, reducing the total amount of office space they used. This is a clear case of productivity enhancement through a reduction in the use of capital. Technological advances offer more subtle but perhaps more spectacular examples. In aircraft manufacture, for example, a new generation Boeing 757 has less than half as many parts as the older 707, enabling it to be manufactured more quickly and inexpensively. Similarly, new airliners are designed using computers and software rather than by building prototypes, reducing the amount of capital used in aircraft design, and in line with Austrian capital theory, shortening the structure of production by reducing the actual time from design to manufacture.[2] Examples can illuminate the point, but the general idea is that entrepreneurial

[1]See Lewin (1996) for an insightful discussion of Austrian capital theory. He notes some difficulties even in trying to measure the length of the structure of production (see, for example, pp. 148–52), but there is less ambiguity in measuring the amount of saving than the length of the structure of production. In any case, Lewin notes that technological innovations can create growth by shortening the structure of production.

[2]This example might be interpreted differently. If the use of computers is viewed as adding a stage (or more) to the structure of production, then the example illustrates how the structure of production, measured in stages, can lengthen even as the time of production and the dollar investment in capital is lessened. Again, Lewin (1996) discusses the ambiguities in actually determining what constitutes a stage in the structure of production.

insights often involve methods of reducing the capital used in production, or shortening the production process, which enhances productivity and growth. Examples aside, one can see that in principle, an entrepreneurial insight can lead toward producing goods using less capital or by shortening the amount of time involved in production.[3] Thus, economic growth can occur without additional investment, and can occur without lengthening the structure of production.

Of course, investment in capital goods and lengthening the structure of production is an important contributor to growth. Henry Ford's adoption of the assembly line is a good example. My point in this section is that entrepreneurial insights often lead toward ways to shorten the structure of production or to reduce the use of capital, and in these cases growth can be enhanced without additional saving and investment.

THE MICROSOFT EXAMPLE

My article used Microsoft as an example, saying that Bill Gates made his fortune by capitalizing on entrepreneurial opportunities created by earlier innovators in the computer industry. Shostak challenges this, saying that Gates made his fortune "because he raised and risked his own capital when other people were unwilling to do so." This is a factual error, and correcting it can help illuminate the nature of entrepreneurial opportunity. In fact, many people risked their capital to try to capture the market that Gates eventually dominated. Steve Jobs and Steve Wozniak tried to interest major computer companies in their personal computer, and when those established companies failed to recognize the opportunity, founded their own company, Apple Computer, risking their own capital. The Apple operating system predates Microsoft MS/DOS, and the Macintosh windows operating system predates Microsoft Windows. Furthermore, when Gates entered the market with MS/DOS (and the PC/DOS variant sold with IBM personal computers), the PC operating-system market was then dominated by the CP/M operating system, written by Gary Kildall and sold by his company Digital Research (DRI). Kildall and DRI negotiated with IBM to use CP/M as an IBM PC operating system, and only when talks between Kildall and IBM broke down did IBM strike an agreement with Gates and Microsoft.[4] But Gates even had competition for the IBM PC operating system. Originally, PC/DOS software was sold separately from the PC hardware, and IBM originally offered a choice of three different operating systems (including UCSD Pascal, supported by a state university), with Microsoft only supplying one

[3]This point refers to the amount of time required to produce a particular good, and not to the length of the structure of production in general. If the structure of production for aircraft is shortened, for example, but there is no change in time preference that would warrant a change in the interest rate, this would free some investment funds that could be used to lengthen the structure of production for other goods or could cause an economy-wide shift toward goods with longer production structures. Thus, the structure of production could be shortened for one good but remain unchanged for the economy as a whole after adjustments in other markets.

[4]The brief background reported here was culled from several web sites after doing an internet search on "Gary Kildall" and "Digital Research." Interested readers can follow-up this way, and this story sheds much light on the early evolution of the PC industry. The internet itself is an interesting example of a technology that in many ways conserves capital, apparently (because it relies heavily on pre-internet communications infrastructure) saving more capital than it consumed to create. While particular entrepreneurs have profited from insights on how the internet might be used, its evolution as a commercial and communications medium falls more in the category of a result of human action but not of human design, in line with Hayek's idea of economic evolution.

of the three choices. Also, at that time (early 1980s) Radio Shack was a large corporate player in the PC industry with their own proprietary TRS-80 operating system. Then, in the late 1980s, when Microsoft split from IBM to compete on its own, IBM competed with their OS/2 operating system. Many competitors, both corporate entities and individual entrepreneurs, risked their own capital in the PC operating-system market.[5]

The point is that when this new entrepreneurial opportunity arose, it was noticed and acted upon by many entrepreneurs who risked their own capital. Steve Jobs and Gary Kildall are two individuals who clearly risked at least as much as Gates (who had the corporate support of IBM). In addition, many corporations and even state universities were competing for the market Gates eventually came to dominate. In hindsight, we can analyze what enabled Gates to dominate the market, but Shostak is clearly wrong that Gates was the only one willing to risk his own capital to compete in that market. A new entrepreneurial opportunity was created that did not exist five years prior, and many individuals quickly saw the opportunity and attempted to capitalize on it.[6] This is consistent with my argument that once entrepreneurship creates new opportunities, they tend to be noticed and acted upon rapidly. Shostak asserts a fact (that Gates was the only one willing to risk his own capital) in support of his argument, but Shostak is wrong on the facts, and the true facts support the thesis of my original article.

ENTREPRENEURSHIP AND THE CREATION OF ADDITIONAL ENTREPRENEURIAL OPPORTUNITIES

Hülsmann misunderstands one point in my article, and a clarification is in order. One of my main points is that entrepreneurship creates additional entrepreneurial opportunities, but Hülsmann is correct to note that it also destroys other entrepreneurial opportunities. I did not mean to imply that the number of new opportunities created will exceed the number of old opportunities destroyed, and agree with Hülsmann that it would be impossible even in principle to know whether the number of new opportunities created exceeds the number of opportunities destroyed. However, it is clear that the new opportunities created must make better use of resources than the old opportunities destroyed, because if they did not, the old opportunities would still be potentially profitable. This is the key point. As Hülsmann noted, the actual number of opportunities is in principle unknowable, and is irrelevant to the relationship between entrepreneurship and growth. However, the newly created opportunities must be better suited to satisfying human wants than the old ones that are displaced, which creates an environment conducive to growth.

---

[5]A similar story could be told in the applications market, where Wordstar, WordPerfect, and Lotus 123 once dominated the markets that Microsoft came to rule with its Office software.

[6]Interestingly, both Apple and IBM sought to enter the market by bundling their operating systems with their hardware, while Kildall and Gates did not sell PCs that ran their operating systems. In hindsight, the bundling strategy appears inferior, although it is unclear why, because computer software is a relatively non-excludable joint consumption good, and bundling can provide a method for controlling the good's distribution. See Holcombe (1997) for a further discussion of the issue. The point is that, many people perceived the availability of the recently-created profit opportunity that Gates capitalized on, and many people risked their own capital to try to make those profits. The availability of profits was noticed by many, but one person was much more successful at producing what was required to get those profits.

Hülsmann makes a more substantial objection to my thesis that entrepreneurship creates additional entrepreneurship. He says, "*Either* acting man chooses where to turn his perception, *or* his perception is caused by external events. Only if the former holds true can there be something like an economic science" (p. 65). But Hülsmann offers a false dichotomy. Man can both choose where to look and can be influenced by his environment. For example, when a fire truck roars by, its siren blaring, that external event causes people to notice and stay clear. If sirens did not alert people by affecting their perception, there would be no point in putting them on emergency vehicles. Entrepreneurial activity attracts attention in much the same way as a fire truck's siren. At the end of the twentieth century, the attention of many entrepreneurs is attracted by developments in the computer industry because external events signal them that there are many profit opportunities available. This in no way says that people cannot choose where to look for profit opportunities, emergency vehicles, or anything else.[7]

THE ENVIRONMENT FOR ENTREPRENEURSHIP AND GROWTH

Hülsmann ends his comment by drawing a completely mistaken policy conclusion from my analysis. He says, "If economic growth were really stimulated by change as such, why should government not start to interfere randomly in the economy?" (p. 65). I never said that growth is stimulated by change, I said that growth is stimulated by entrepreneurship. Thus, the policy conclusion implied in my analysis is that policies that foster entrepreneurship create growth. While my article did not discuss the policy implications directly, in other recent work co-authored with James Gwartney and Robert Lawson (1999) I do take up the issue and find that lower taxes and government expenditures lead to more economic growth, that protection of property rights enhances growth, and that less government regulation, greater monetary stability, and the absence of prohibitions on voluntary exchange enhances growth.

The policy questions are important because while much of the world has seen substantial economic growth in the last half of the twentieth century, many nations are being left behind, and as Krueger (1993, 1997) has argued, economists have contributed to the plight of some slower-growing nations by giving them inappropriate policy advice based on neoclassical growth theory. Thus, growth theory is of more than just theoretical interest, and in this area, the Austrian School has much to contribute. As my original article indicated, mainstream growth theory focuses on the role of inputs and technology, but inputs and technology cannot produce growth without an environment that fosters entrepreneurship. Echoing Krueger, I believe that the application of mainstream growth theory has often been harmful to economic growth because the mainstream theory ignores the market process. The purpose of my original article was to show that entrepreneurship is an integral part of the process of economic growth, and to illustrate the advantages of the Austrian approach to growth over the mainstream approach. While my original article focused mainly on the theoretical implications, ultimately the policy differences

[7] In the purely Kirznerian setting, people just observe profit opportunities, and looking for them implies an investment activity outside of narrow Kirznerian entrepreneurship. Like Hülsmann and Shostak, I take a broader view of entrepreneurship and do think that entrepreneurship can include people who actively seek out profit opportunities. Even though they make this choice, their perception still can be influenced by external events.

between the approaches are more significant, and offer an important reason for additional development of the Austrian approach to economic growth.

REFERENCES

Gwartney, James, Randall Holcombe, and Robert Lawson. 1998. "The Scope of Government and the Wealth of Nations." *Cato Journal* 18(2): 163–90.

———. "Economic Freedom and the Environment for Economic Growth." *Journal of Institutional and Theoretical Economics*. Forthcoming.

Holcombe, Randall G. 1997. "A Theory of the Theory of Public Goods." *Review of Austrian Economics* 10(1): 1–22.

Krueger, Anne O. 1993. *Political Economy of Policy Reform in Developing Countries*. Cambridge, Mass.: MIT Press.

———. 1997. "Trade Policy and Economic Development: How We Learn." *American Economic Review* 87:1–22.

Lewin, Peter. 1996. "Time, Change, and Complexity: Ludwig M. Lachmann's Contributions to the Theory of Capital." *Advances in Austrian Economics* 3:107–65.