

other firms. As such, because the benefits of geographic clustering spill over beyond the boundaries of the firm, market forces produce less geographic clustering than society needs. Each firm in a cluster confers benefits on other firms in the cluster, but no individual firm takes the "external" benefits it produces into account when making its own location decisions. In addition, the firms in a cluster usually have common needs (e.g., for worker training or infrastructure) that they have a harder time meeting on their own. Clustered firms, therefore, usually require external coordination (from governments or industry associations) to effectively meet these needs. But because no individual firm can capture all the benefits, it's rational for firms to let others in the cluster bear the costs of coordination, which leads to free-rider problems. Failure to meet these common needs makes clusters smaller and less productive than they would be otherwise. If the benefits from clustering to all firms in economies were considered and the common needs of all firms in each cluster met, there would be more clustering and thus more innovation and higher productivity.

8. There Is More than One Equilibrium at Which Economies Can Settle, and by Definition, One of Them Is Worse from a Societal Perspective

If you remember your freshman year microeconomics class, you'll probably recall graphs of supply and demand curves intersecting. Usually, it was a picture showing something like the price at which farmers would sell their wheat and the price that buyers would be willing to pay. In this ideal universe visualized by neoclassical economists, there is only one point at which supply and demand are in equilibrium, and the job of government is to not get in the way of the market attaining it. At any particular time in this idyllic world, there should be only one price of wheat such that the market "clears," meaning that all who want to buy and sell at that price are able to do so. If government subsidizes or taxes wheat, the market will not efficiently allocate wheat production.

But, in fact, when we move to the economy-wide level, there can be multiple equilibriums in an economy, with some better than others. And markets acting on their own may actually pick the inferior one, with society suffering as a result. Research by economist Elvio Accinelli has shown that there is strategic complementarity between the percentage of high-skill

workers and high-value-added, innovative firms in an economy. He finds that economies can be in perfect neoclassical equilibrium at either a high level of innovation and high skills or in a "poverty trap" of low skills and underinvestment in innovation. In other words, if there are not enough skilled workers, firms will not adopt advanced technology leading to higher productivity since their workers don't have the needed skills, and if firms don't adopt advanced technologies, workers won't seek out the skills needed to use these technologies. Hence, economies can settle into a "poverty trap." This trap can be avoided if the number of innovative firms in an economy exceeds a threshold level while the number of skilled workers also increases. As such, innovation policy can help move economies to this higher level equilibrium if it spurs workers to get more skills and firms to use more skills by investing in advanced technologies and high-performance work organizations.<sup>76</sup>

#### 9. The Interests of Geographically Mobile Firms in Locating Innovative Activity May Diverge from Those of a Nation's Residents

Another failure has emerged that, while not a market failure as defined by economists, is in fact a failure as defined by the average citizen or elected official. This is the potential divergence between the interests of geographically mobile firms and those of the residents of a country.<sup>77</sup> The decisions that firms make about where to locate innovative activity are rightly based on their own interests, but these may or may not coincide with the interests of local residents. For this reason, many countries, just like most U.S. states after WWII, "intervene" in their economies with robust innovation and economic development policies designed to tilt the choice of businesses to invest in their location. These countries are not content to let the "market" determine how many and what kinds of jobs are created; rather, they work to ensure that they gain more high-paying, high-productivity jobs. Neoclassical economists might bemoan this reality, but it exists, and the responsibility of elected officials in any nation is to maximize the real economic welfare of their citizens, not some theoretical, textbook global market allocation. And if neoclassical economists were being forthright, they would admit that their economic prescriptions don't work for any one country if other nations have put in place



economic development policies—especially ones that intentionally distort global markets.

10. There Can Be a Market Failure from Growth Itself

As Harvard economist Benjamin Friedman has shown, innovation and growth don't just provide narrow monetary benefits of the kind economists count.<sup>78</sup> Growth or its lack, according to Friedman, produces positive or negative externalities. Growth leads to more tolerant societies, improves civic discourse, and generally leads to societies that are more humane. Economic decline or stagnation leads to the opposite, as we saw in 2011 in societies like Egypt and Tunisia, where neither the market (nor failed economic policies) produced enough growth. To use Friedman's example, it was a lack of growth that paved the way for the Nazis to take power in Germany in the 1930s, a development that imposed untoward human and financial costs on humankind. Surely, investing a few billion dollars on proactive growth policies in the late 1920s and early 1930s to avoid the Great Depression and the subsequent rise of Hitler would have produced vast benefits and avoided the enormous costs the human race ultimately paid for Nazi depravity.

These multiple and systemic failures in the process of innovation should make it clear that, left to themselves, markets will produce significantly less innovation, productivity, and competitiveness than nations need. As discussed above, however, this is not a call for some kind of twenty-first-century state socialism or heavy-handed regulatory state, for that would produce the same, if not worse, result. In a globally competitive world, the cost of indulging in either free-market or state-directed ideology is something that countries can ill afford. This is why a growing number of nations have put in place robust and strategic innovation policies that balance market and state.

However, nations not only want to foster more innovation than the market alone will produce but they also want to win, or at least not lose, the race for global innovation advantage. Indeed, even if there were no market failures, countries would need an innovation policy because the stakes have been raised. To return to our soccer analogy, when one team gets a head coach,

trainers, and a game plan, your team better do so as well, or it's going to find itself at the bottom of the rankings.

*Why It Matters to Get Innovation Policy Right*

As modern technologies have brought countries increasingly closer together, global economic competition has become more intense than ever. Companies now face many more competitors from around the globe; and, at the same time, they now enjoy the opportunity to invest in many more places. As IBM chairman Sam Palmisano framed it, the last decade has seen the rise of the globally integrated enterprise. As a result, government officials in many countries now wake up every morning asking how they can do whatever it takes to win in the global competition to achieve innovation-based economic growth and to attract foreign investment and talent across their borders. These governments scratch and claw to win every last business deal and to create every last job they can in their countries, even by taking steps that clearly violate the spirit and the letter of World Trade Organization (WTO) law. In contrast, the unquestioned position of the United States as the world's leading economy over the past half century has led too many U.S. policymakers to falsely believe that America is immune from such ferocious global competition.

So while almost all other countries believe that they are competing in the "World Cup" of innovation, to borrow a popular sporting metaphor, the United States, uniquely, doesn't even think it's in a competition because "countries don't compete." Perhaps America just thinks it's a soccer practice, or perhaps a "friendly" without any permanent consequences. But the reality is that most countries understand they are in international economic competition and have developed strategies to compete, as figure 5.2 shows. However, just as in a soccer match, there must be rules about what constitutes fair and unfair competition.

To be sure, there is nothing sinister about countries engaging in fierce innovation and economic competition and there is nothing wrong with them competing to win—as long as they are playing by the international rules of commerce established by the global community. Indeed, as we've explained, competition among governments has become a critical factor in

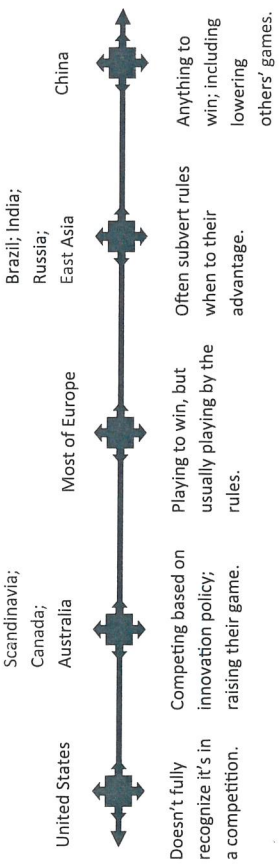


Figure 5.2 Countries' Perception of International Competition and How They Compete

determining which economies win and which lose in the race for global innovation advantage.

Thus, when a country intensely competes to win, within the rules of the system, doing so benefits both itself and the world. This is because fair competition forces countries to put in place the right policies on science and technology transfer, R&D tax credits, lower corporate tax rates, education policies, and so forth. In other words, competition forces countries to ratchet up their games, and to enact an array of "good" innovation policies. And if all countries are in the position that they have to raise their game through good innovation policies, the end result is that the world is much better off. In fact, it's only when one country decides that it doesn't need to raise its game because it thinks it's not in a competition (e.g., the United States) or when countries cheat and engage in mercantilist, negative-sum policies, that the world fails to realize these benefits, and actually ends up worse off. Put in terms of our soccer analogy, the world is better off when competition forces each country's soccer team to become better. Even if it hurts the United States or other countries when Spain's soccer team gets stronger, Spain's quality forces other teams to get better. The same dynamic holds with the quality of countries' innovation policies in fostering their global economic competitiveness, and that of the rest of the world.

Thus, when America invents the R&D tax credit, or France triumphs the United States by offering an R&D tax credit six times more generous, or Denmark creates innovation vouchers for small businesses, or the Netherlands and Switzerland offer dramatically lower taxes on the profits gener-

ated from a newly patented product, or a country can lower its corporate tax rates because its public sector operates so efficiently, this is all tough, fair competition, like playing a hard-fought World Cup match. Countries' constructive innovation policies spur other countries to emulate or improve on them, and everyone wins. The following chapter explores these types of "good" innovation policies that scores of countries have put in place.

The problem comes when countries start to cheat and contravene the international economy's established rules (as if they were bribing the referees or using studded cleats in soccer). These practices—the mercantilist ones we describe in chapter 7—can indeed help countries win the game. But while these practices can work, using them is akin to cheating or rigging the game. And the problem is that not only do these policies harm other countries, they then encourage other countries to cheat, ultimately undermining the utility of the international trading system and causing the global economy to suffer, as we have seen recently with the global financial crisis. This is why, as we describe in chapter 11, it's critically important for countries to compete intensely but fairly. It's also why interested observers must be able to distinguish between the kinds and effects of policies that countries are putting in place—only then can they nurture the ones that are positive-sum while contesting those that are negative-sum and try to move them into the win-win category. The next two chapters provide a guide for how to do so.



ROBERT D. ATKINSON AND STEPHEN J. EZELL

# Innovation Economics

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