

Preparing for the 21st Century Economy

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A

fter 30 years of university teaching and almost five years as a Reserve Bank president, Anthony Santomero knows the importance of education to a well-functioning economy.

In recent years, he has seen several broad, long-term trends emerge—trends that will undoubtedly shape our environment and our economic fortunes. Here he talks about two trends he deems to be of particular importance. First is the steady increase in international trade that has spilled over from the second half of the 20th century into the new millennium. Second is the revolution in information and communications technology that has spurred productivity and spawned a need for knowledge workers.

After three decades of university teaching, it should come as no surprise that I think education is critically important to our nation's future. But in light of my current position, I would like to offer some perspective on the economic context for education in the 21st century. I also want to stress the importance of education and cooperative education for our nation's students, their futures, and the very future of our nation in the world order. This may sound like hyperbole, but I will suggest that it is not. Rather, it is a reasonable reading of the challenges we face as a nation and the stake we all have in our success in educating the next generation.

How do I come to this conclusion, and why the strong assertions? Let me explain. Although my university career centered mostly on economics and business as academic disciplines, serving as the president of the Federal Reserve Bank of Philadelphia and a member of the Federal Open Market Committee has given me a broader perspective on the current trends and future direction of our nation's economy.

My colleagues and I focus most of our discussion on economic growth, inflation, and employment. In turn, much of that discussion focuses on what will happen over the coming year or two at a very aggregate level.

We also consider longer term trends and how they will shape the economic conditions facing our society in the future. A wide range of issues comes up during these discussions. How will geopolitical trends affect the U.S. economy? How will demographics here and abroad affect aggregate savings and labor supply? How will the ongoing changes in the use of technology affect productivity and wealth? How many jobs can our economy create each year based on these trends in labor productivity? Some of these questions are global in focus; some are local. Some are social; some are technical; and some are political. But all of these broad long-term trends will shape our economic fortunes in the future, as they alter our environment.

Two broad trends are unfolding in our economy as this 21st century opens, and we should consider their



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implications for our society, for our educational institutions, and for cooperative education.

TWO OVERARCHING FORCES OF ECONOMIC CHANGE

The first noteworthy trend is the steady increase in international trade over the second half of the 20th century and into this new millennium. Trade increased steadily between major developed nations over the past several decades and now accounts for a sizable portion of economic activity on both sides of the Atlantic and the Pacific. We now live in a globally interconnected economy. With increased trade, markets have expanded and new nations have joined the international party. Developed nations turned their neighbors into economic dynamos, with the rapid development of nations such as Mexico, Korea, and Ireland demonstrating that “a rising tide raises all boats,” or at least all those tied together by trade and finance.

In addition, many more of the world’s economies moved to adopt market-based economic systems, replacing less effective centrally planned economic models. This shift was most obvious in the breakup of the Soviet Union, but it also became increasingly evident in Asia, with China a notable example. Although changes in these countries may not have resulted in strictly laissez faire economic systems — the market is less than free in many of the nations that have emerged in the wake of these changes — market competition is much more important now than during the previous 50 years or more. These changes were yet another contributor to the increased globalization of world markets.

As we entered this century, the increase in cross-border trade has opened opportunities and linked economies around the globe. Globalization also has been an enormous

force of change to our societies, to our economies, and to our daily lives. This globalization is a good thing. It fosters greater specialization and gains from trade, affording everyone higher living standards.

Yet, it has not been the only force shaping this century’s economic environment. In fact, the revolution

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in information and communications technology would undoubtedly be high on any list of the fundamental drivers of the economy’s evolution over the last decade, including the most recent business cycle. Cheap hardware, sophisticated software, and extensive networking capabilities began transforming business processes in earnest in the latter half of the 1990s.

History tells us that such technological revolutions do not produce smooth economic evolutions, and this case has been no exception. Nonetheless, the application of new information technologies brought real economic benefits. As these technologies were introduced into organizations and infused into business processes, productivity accelerated measurably.

At the same time, however, these technologies spawned unrealistic expectations that were manifested in a stock market bubble and overinvestment in new capital. When the bubble burst and the investment boom de-

flated, aggregate demand decelerated rapidly, ultimately driving the economy into recession.

But in the end, the technology is still there. As a result, productivity continues to rise rapidly in the U.S. Output growth is robust, and we are embarked on a new period of sustained expansion.

Even more noteworthy is the fact that the growing deployment of next-generation technology has transformed the way we do work, not only its speed. The technology revolution interacted with and has been an important contributor to the first force of change driving the evolution of our economic structure, namely, globalization. By slashing communication costs, new technologies have made markets more globally integrated.

These new technologies continue to yield strong productivity and profit growth in all types of businesses, as processes for producing and delivering goods and services continue to evolve and improve. Plus, globalization has created an ever more flexible international financial system.

As this current economic expansion continues, many economists believe that these trends are fundamentally changing the nature of competition for firms in the U.S. and around the world. These two factors have placed enormous pressure on firms to cut costs and to improve efficiency in the interests of self-preservation. This is helping to generate a virtuous cycle in which further investment in innovation and technological advances are leading to further gains in productivity, generating higher standards of living than ever before.

THE IMPACT OF AN EVOLVING ECONOMY ON THE U.S. WORKFORCE

The U.S. worker is not a passive observer in this process. Technological

advances are continually altering the shape, nature, and complexity of our economic processes. The innovations that have accelerated productivity and contributed to higher levels of growth also require the development of our human capital. The changing nature of our economy means that workers must be smarter, more adaptable. They will have to continually gain new skills.

At the same time, technology and competition from abroad have risen to a point where demand growth is declining for the lowest skilled workers and increasing for higher skilled, more educated workers in the U.S. workforce. This is demonstrated by increasing wage differentials between higher skill and lower skill workers. In other words, while highly skilled workers enjoy increasing incomes, real wages for less skilled workers generally have remained flat.

In this new world, the income earned by a worker depends on his or her skills and education. The fact that over the years more than 94 percent of the U.S. workforce has been employed indicates that U.S. workers apparently have been sufficiently skilled and motivated to learn the new tasks that enable them to earn, on average, an ever-rising real wage. Yet, even now, it is becoming increasingly difficult for some members of our workforce to satisfy the ever-changing demands of the knowledge economy.

Many of those currently unemployed and even some currently holding paying positions need to be equipped with the skills and knowledge to compete effectively for the new jobs our economy will create in the 21st century. This is a long-term process, but it will address a long-term need. The development of people's capabilities in mathematics, writing, and verbal skills is key to their ability to learn and apply additional skills and, thus, to earn higher real wages over time. In

short, education is a critical need in this world of high-tech manufacturing and services.

The proportion of our labor force with some college education has continued to grow. Yet, we are still graduating too few skilled workers to address the imbalance that has developed, and will continue to develop, between the supply of knowledge workers and the growing demand for them. This situation suggests a looming shortage of highly skilled workers and a potential surplus of less skilled workers. We have already seen evidence of its effects.

As the restructuring of U.S. product and labor markets is unfolding in a global context, many firms are finding themselves under constant pressure to invest in, and maintain, highly efficient workplaces.

We all know of the ongoing controversy surrounding H visas and the importing of workers in technical fields over the last decade. We all lament the shortages of U.S.-trained engineers for the demand already evident in our economy. Those in the health-care fields recognize the shortages of doctors and nurses as a sign of the times when skills, training, and higher education are highly valued in the U.S. economy.

At the same time, as the restructuring of U.S. product and labor markets is unfolding in a global context, many firms are finding themselves under constant pressure to invest in, and maintain, highly efficient workplaces. They have responded by deploying new product and labor market strategies to access goods and services globally, both here in the U.S. and elsewhere around the world. Their ongoing challenge is to learn to transform their organizations to reap the benefits of comparative advantages for their firms

and the U.S. economy as a whole.

The recent trend in the international outsourcing of jobs — also known as “offshoring” — is just one manifestation of this new global sourcing paradigm, and this has underscored the importance of cultivating a more highly skilled and trained workforce in the U.S. Offshoring has been the trend in manufacturing for a long time. But now it seems to be intensifying in manufacturing, particularly with the opening of the Chinese economy. It has also been spreading to the service sector. Lower skill, call-center,

and other service jobs have been migrating to India and elsewhere in the Far East for several years. We have also seen these jobs migrate to Ireland, Eastern Europe, and Latin America. More recently, the process has been moving across industries to some that are usually insulated from such pressure — higher level professional service jobs, such as accountants, financial analysts, and software engineers.

At this point, we have yet to accurately quantify the impact of the offshoring phenomenon on the aggregate U.S. labor market, in part because it is difficult to measure with any accuracy. In any case, this may be less important than acknowledging that the tech revolution is creating an increasingly integrated global market for services as well as goods.

In essence, the introduction of new and lower cost information and communication technologies is expanding the size of virtually every market. Information can be disseminated

and transactions effected between individuals and organizations located essentially anywhere in the world at lower cost than ever before. The bigger the market, the greater the opportunities for specialization and gains from trade.

In addition, new technologies reduce the cost of coordinating activities between firms regardless of location. This allows for even greater specialization by firms, a more segmented value chain, and even more efficient ways of delivering goods and services virtually anywhere in the world. Even within firms, technology reduces the cost of coordinating activities across sites. So internal processes, such as research and development, production, distribution, and service functions, can be further segmented, and each segment can be located at the site of greatest comparative advantage.

In short, as a result of the technology revolution, the demand for labor in the U.S. has become more sensitive to international labor-market and other economic considerations.

As an economist, I recognize that the free international flow of capital, labor, goods, and services helps keep our economy healthy and strong. Jobs are constantly being created and destroyed, as the economist Joseph Schumpeter noted almost a century ago.

When services can be sourced more cheaply overseas than at home, American firms naturally have an incentive to pursue that opportunity. Economists will note that such transactions raise real incomes on both sides, as resources are advantageously redeployed. These labor market changes will position our economy to take full advantage of the international gains from trade created by the revolution in information technology.

At the same time, it is worth remembering that the U.S. economy has

been experiencing insourcing as well as outsourcing. Insourcing to the U.S. includes jobs of all categories, but it tends to be weighted more heavily toward higher skill and higher paid jobs in professional services, research, and science. In fact, some business associations argue that over the last 15 years, the number of insourced jobs in the U.S. has been growing faster than the number of outsourced jobs.

Yet, some firms or employees affected by outsourcing will not reap any

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benefit from insourcing to the U.S. For them, the movement of jobs inevitably and permanently alters the pattern of employment.

In any case, as competition induces companies to move certain jobs abroad, we must create new jobs in their place and prepare our workforce to fill them. In short, outsourcing developments and their impact on labor markets need to be addressed to allow the U.S. economy and its workforce to continue to flourish. Most likely, the result will be better, higher-paying jobs, as long as we ensure that our workers and students are well prepared for the changing job market.

This process has consequences for real people that need to be addressed. The short-run effect of outsourcing of U.S. jobs is structural dislocation and unemployment. Workers who become unemployed as a result of these types of economic changes must be given aid

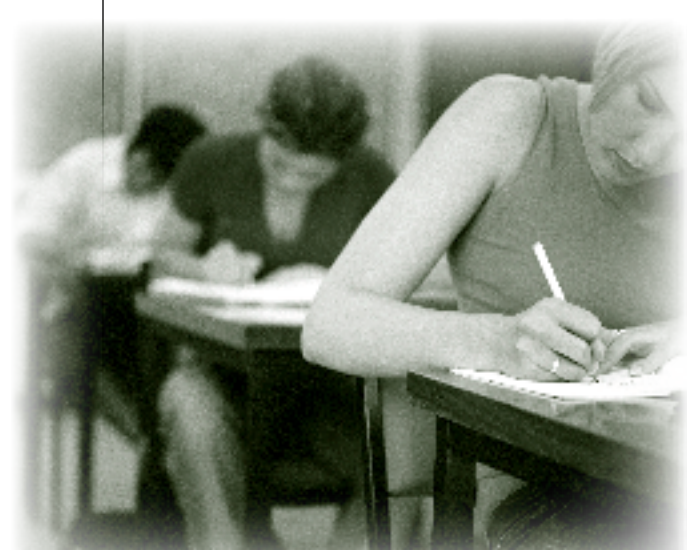
and assistance to help them adjust to the new marketplace. This type of empathy and compassion for those suffering from job losses is a characteristic of our society.

But such heartfelt expressions of empathy and compassion are not the long-term answer to these broad trends. Education, not just empathy, is the long-term answer for improving our workers' ability to adjust to the realities of the 21st century's marketplace. Adequate private and public investment in skills and lifelong education and training are paramount, so that workers can take positions in other industries in this new world. Education and training are the key long-term solutions.

EDUCATION AS THE ANSWER

To address the ongoing and increasing demand for knowledge and knowledgeable workers, our first recourse as a nation must be to look to our education system. In some dimensions, our educational institutions are up to the task. Our universities are the envy of the world, and higher education has been an export industry for some time in the U.S.

Unfortunately, the same cannot be said about our primary and secondary educational system. Many of our students languish at too low a level of skill and leave school inadequately prepared. The more technical knowledge our students acquire in our education system does not stand up well to inter-



national comparisons. The result has been an excess supply of labor into the slower growing or declining areas of our economy. Accordingly, we apparently have quite a distance to go before we catch up to other countries in technical training, including math and science, and our level of literacy needs considerable work.

This is not just an assertion or a sense of the market; evidence supports this conclusion. A study by the Education Trust,¹ a Washington-based research group, found that less than half of America's schoolchildren read proficiently at their grade level. This may be part of the reason our high school seniors score well below their counterparts in math and science in almost every other developed country in the world. Indeed, after decades of leading the world in the number of students who complete high school, the U.S. currently ranks only 17th.

Further, according to a report released by the Educational Testing Service,² literacy among American adults ranks 12th among 20 industrialized countries. The report presented some alarming conclusions. A staggering 45 percent of Americans exhibited an inability to read or write at the high-school-graduate level. Almost half of those, 20 percent, scored at a literacy level below that of a high-school dropout.

Our future prospects seem troubling as well, considering 16 to 25 year olds not only underperformed their foreign counterparts but also did so

¹ Education Trust, "Youth at the Crossroads: Facing High School and Beyond," *Thinking K-16*, Winter 2001.

² Andrew Sum, Irwin Kirsch, and Robert Taggart, "The Twin Challenges of Mediocrity and Inequality: Literacy in the U.S. from an International Perspective," Policy Information Center, Educational Testing Service, 2002.

to a greater degree than Americans over 40. Moreover, the U.S. has the largest gap between highly and poorly educated adults. With poorly educated immigrants and minorities becoming an increasingly prevalent force in U.S. labor markets, the nation would do well to ensure improvements in adult training and education. Lack of im-

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provement in this area not only could, but will, constrain the growth of U.S. job opportunities in the future.

It seems clear that our school system needs to better respond to the changing economy. We succeeded in responding to this type of challenge in the past. In the early 20th century — a time in which the nation was fostering a rapidly developing manufacturing sector — the educational system took on the responsibility of broadening the skills of students to meet the needs of a growing economy. High-school enrollment rose rapidly, and graduates entered the workforce better skilled and prepared with the training necessary for success in many occupations of the day.³

Today, as in the past, we need to be forward looking to adapt our educational system to the evolving needs of the economy and the realities of our changing society. Those efforts will require the collaboration of policymakers, educators, and businesses.

³ "The Critical Role of Education in the Nation's Economy," remarks by Alan Greenspan at the Greater Omaha Chamber of Commerce 2004 Annual Meeting, Omaha, Nebraska, February 20, 2004.

EXPERIENTIAL LEARNING

This increase in the knowledge and skills that are needed in the labor force is not likely to result from more investment in education alone. Research on the development of the knowledge economy suggests there is an important role for hands-on training in addition to traditional classroom learning.

Our students need grounding in not only what needs to be done on the job but also the whys and hows that can be more easily explained by those steeped in the process. The structure and culture within our nation's firms are critical components of the work experience, and adding this to the educational experience is a vital part of businesses' ability to absorb and effectively use the nation's labor force.

Too often, students graduate without experiencing hands-on or on-the-job training. They lack experiences integrating theory and practice. This puts them at a disadvantage when searching for a job and will leave them less than adequately prepared for the changes taking place in the current and future marketplace.

Market-driven, career-integrated education can and must play an important role in our nation's future economic health. Many institutions already offer cooperative education and internship programs through which students mix employment experience with academic study. These institutions are geared to providing graduates with the kinds of education the marketplace demands and matching them up with local companies that can make the most of their skills.

In our region, Drexel University and other institutions of higher learning understand the importance of a workforce that can support the trends in the economy — a workforce that will have the technical know-how to cater to growth clusters in their region

and will learn to contribute early and often to the firms and industries that make up their local economy. Here in the Delaware Valley these areas of concentration include such clustered activities as biotechnology, health sciences, and many of the information and communications technologies. Let me cite just a few other ways in which experiential learning is being used to great effect in and around the Philadelphia area.

Health science students are conducting genetic research at the world-renowned Children's Hospital of Philadelphia, the oldest children's hospital in the country. Arts students showcase their work on the big screen at the Festival of World Cinema, on the catwalk at Saks Fifth Avenue fashion shows, and on the stage at the Kimmel Center for the Performing Arts.

Technology students design microscopic robots as part of an initiative to turn the Delaware Valley into "Nanotech Valley." The Nanotechnology Institute strives to build partnerships throughout the mid-Atlantic region. Through participating educational institutions, these programs prepare graduates for positions in the pharmaceutical and life sciences sectors.

Another example is Lockheed Martin. One of the largest employers in the region, it offers an internship program that allows students to experience first-hand what it takes to launch a great career. Many interns are hired full time after graduation.

Lack of such valuable hands-on training nationwide could delay our country's progress toward ensuring that we have a vibrant knowledge economy. Policymakers, academic institutions, and hiring firms alike need to focus on how to increase hands-on

training as a component of students' formal education to ensure an adequate supply of knowledge workers in this century.

Cooperative education is more than an investment in training or in education; it is the cultivation of an environment of learning. Employers find college cooperative education a vital resource for human resource management. Combining classroom studies with learning through productive work experiences provides progressive integration of both theory and practice. It is also a mutually beneficial process through which all parties

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involved gain advantages. Students benefit through increased learning and improved job opportunities. Academic institutions benefit by being able to expand the range of opportunities offered to students and by accessing real-time industry feedback to keep their curricula current. Firms benefit through access to a pool of well-prepared employees and a facilitated recruitment process. Most important, society as a whole benefits, as we increase the effectiveness and relevance of education and build a more skilled, competitive, and robust workforce.

Through the partnerships developed in cooperative education, we can connect with the realities of today's workplace. In this way, we cultivate a more productive, highly skilled, technically trained workforce that will encourage insourcing of jobs from abroad to offset those that are outsourced.

CONCLUSION

To sum up, several broad trends are affecting the economic environment that our workforce will face in the 21st century. The growing interdependence of the world economy is one. Innovations and technological change fueling rapid productivity growth as well as supporting an increased pace of globalization in almost all industries, both manufacturing and services, are clearly another.

These trends will lead to continuing changes in the labor markets facing U.S. workers in this century. We will continue to see outsourcing of jobs

to other countries by U.S. firms, and we will continue to see insourcing of jobs as the skills of U.S. workers are sought by foreign companies. The process of reallocating employment and employment opportunities around the world is ultimately beneficial, but it is not painless. There will be winners and losers in the job markets in both developed and less developed nations. We must have empathy and compassion for those workers who become unemployed in the process and should provide them with transitional aid and assistance.

But this is not enough. Education, including cooperative education and training, is the long-term answer for improving our workers' ability to adjust to the realities of the 21st century's marketplace. 