

Preparing for the 21st Century Economy

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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

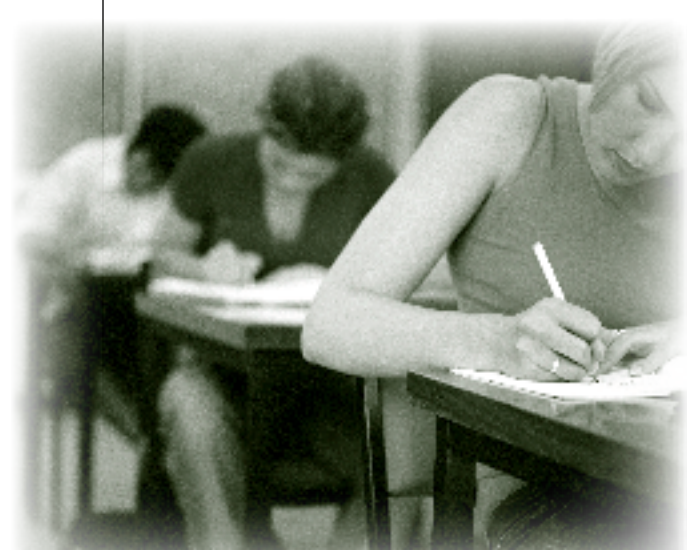
and assistance to help them adjust to the new marketplace. This type of empathy and compassion for those suffering from job losses is a characteristic of our society.

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. 

Ores and Scores:

Two Cases of How Competition Led to Productivity “Miracles”

BY SATYAJIT CHATTERJEE

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acroeconomists have devoted a great deal of effort to understanding the determinants of labor productivity. They’ve generally emphasized variables such as capital stock per worker, technology, the quality of the workforce, and laws and regulations that govern production. Recent research has shown, however, that this conventional view may leave something out: the degree of competitive pressure faced by a production unit. In “Ores and Scores,” Satyajit Chatterjee examines two cases in which increased competition in the product market caused dramatic improvements in labor productivity: iron mines in the Midwest and public schools in Milwaukee.

The standard of living enjoyed by a nation’s residents derives from the productivity of those residents. Given the large differences in the standard of living across countries (and over time for many countries), macroeconomists have devoted a great deal of effort to understanding the determinants of labor productivity. In doing so, they have generally emphasized the positive role of the capital stock per worker (or

the stock of material means of production per worker), the sophistication of the technology embodied in that stock, the quality of a country’s workforce, and laws and regulations that govern production.

Recent research has shown that this conventional view of the determinants of labor productivity may be incomplete. Aside from the determinants listed above, the *degree of competitive pressure* faced by a production unit can also importantly influence the unit’s labor productivity. Specifically, this research has brought to light two examples of increased competition in the product market that caused dramatic improvements in labor productivity. The two cases concern ore production at midwestern iron mines and student achievement in the Milwaukee public

schools — hence, the title of the article.¹

The findings of this research are indeed noteworthy. As we are all aware, falling trade barriers, declining communication costs, and economic development elsewhere in the world are exposing increasing numbers of U.S. businesses to competition from low-cost rivals, both foreign and domestic. This increased competitive pressure was most intense during the years 2001 to 2003, when the U.S. manufacturing and high-technology sectors encountered a three-year slump in demand and the U.S. labor market did poorly in general. Remarkably, during these difficult years, output per hour in the U.S. nonfarm business sector rose at an average annual rate of 3.8 percent per year — well *above* the 2.2 percent rate recorded during the “boom” years of 1995 to 2000.² One cannot help but wonder if there is a causal link between increasing competitive pressure and the faster pace of productivity growth.

However, national (or macro-level) labor productivity can grow for many reasons, not the least of which is the fact that during a downturn, average labor productivity of businesses could rise simply because the businesses that fail (and exit) tend to be the ones with below-average labor productivity. This Darwinian selection is a well-known channel through



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¹ These cases have been described in the article by Jose Galdon-Sanchez and James Schmitz and the article by Caroline Hoxby.

² The data on which this calculation is based are those available on the BLS web site (www.bls.gov) as of January 8, 2005.

which competition affects national, or industry-level, productivity.

But the noteworthy aspect of the two studies reviewed here is that each examined the impact of increased competition on labor productivity at the *micro* level, that is, at the level of production units that were in operation both before and after the change in competitive pressure. Thus, each study establishes the existence of a causal link running from increased competitive pressure to higher labor productivity that is distinct from the effect of Darwinian selection.

Furthermore, the studies shed new light on the determinants of labor productivity. In principle, increased competitive pressure could increase labor productivity via changes in the conventionally recognized determinants of labor productivity. In both cases, however, the increase in productivity was accomplished without any change in technology, worker quality, or regulation. Capital stock per worker (more generally, inputs per worker) did change, but the effect of this change was too small to plausibly account for the large change in labor productivity. In fact, the increase in productivity resulted from a change in how work was organized within the production unit. Thus, this research reveals that the organization of work, or *work rules*, is an important determinant of labor productivity as well. More crucially, the research shows that work rules respond to competition: When competitive pressure is high, production units choose work rules that enhance labor productivity.

The fact that more productive work rules are adopted under pressure suggests that workers might view such rules with disfavor. After reviewing the two studies, I will discuss some reasons why workers might resist more productive work practices. One reason could be job security if workers fear that jobs

would be lost with the adoption of more productive work rules. This possibility probably explains why midwestern mines did not adopt more productive work rules prior to the steel crises. Another reason could be the higher work intensity – and the attendant costs of stress and fatigue — associated with more productive work rules. This possibility probably explains why work practices in poorly performing Milwaukee public schools changed only after

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the voucher program was instituted.

This discussion is useful also because it identifies the types of industries (or occupations) in which resistance to productive work practices can be effective and for which, therefore, an increase in competitive pressure might be expected to raise labor productivity significantly.³ I use this identification to suggest that the ongoing (indeed, accelerating) diffusion of cutting-edge technologies outside of the industrialized world may be wearing down workers' resistance to more productive work practices in many occupations and sectors of the U.S. economy. Indeed, recent productivity and compensation trends in the U.S. may be starting to show the

³ Unfortunately, micro-level studies of labor productivity that exploit differences in the degree of competitive pressure (on production units) resulting from an outside event are relatively rare. Consequently, it is not possible to directly measure the scope of the competitive pressure effect seen in the case of the midwestern iron mines and the Milwaukee public schools. One other micro-level study that also documents the positive effect of competition on labor productivity is by Harry Bloch and James McDonald for a group of Australian firms.

footprints of the competitive-pressure effect documented so clearly by the studies reviewed here.

A PRIMER ON LABOR PRODUCTIVITY

For a business enterprise, labor productivity is the ratio of the *value-added* by the production unit over a given period of time — say, a year — to the total number of *full-time equivalent* workers employed by the

production unit over that same period.⁴ The value-added by a production unit is simply the total value of goods and services produced by the production unit over a given period less the value of all goods and services purchased by the production unit from other firms and used up in production in that period. It's a measure of the value of work done by the production unit over the given period. The number of full-time equivalent workers is simply the total of all full-time workers employed by the production unit over the same period of time plus the full-time equivalent of all part-time workers.⁵ Thus, the labor productivity of a business

⁴ An example of material used up in production is the iron ore used in the production of steel. When we calculate value-added by a steel company over a month, the cost of the iron ore used up during the month is subtracted from the dollar value of the steel produced that month. The cost of other inputs purchased from firms and used up in production is similarly subtracted from the dollar value of production.

⁵ For instance, a firm that has 50 full-time employees working 40 hours per week and six part-time employees working 20 hours per week will have a total of 53 full-time equivalent employees.



enterprise is a measure of the average value contributed by workers over a given period.⁶

For the purposes of this article, it is important to know the kinds of things that can affect labor productivity. In this regard, the most important point to grasp is that labor productivity is a *flow* measure; that is, it has a unit of time associated with it (such as a year). Therefore, one way in which labor productivity can vary is simply through the volume of work a worker can perform in a given amount of time. A production unit in which workers can handle a greater volume of work in a given amount of time will have higher labor productivity.

The volume of work a worker can perform depends, in turn, on several factors. A very important one is the technology and capital stock a worker has access to in the production unit. For instance, a large and highly automated manufacturing plant makes it possible for workers to handle a very

⁶ Labor productivity can also be measured as output generated per hour of work. Indeed, a commonly used statistic on labor productivity in the U.S. (available from the Bureau of Labor Statistics) is output per hour of work in the nonfarm business sector.

high volume of work. Similarly, office workers are able to handle a higher volume of work if they are aided in their tasks by computers and software. Thus, the capital stock per worker is an important determinant of labor productivity.

In addition, there are intangible (but no less important) factors. Workers with high cognitive ability and longer work experience accomplish more in a given period, and labor productivity will be higher in a production unit with better educated and more experienced workers. Also, every production unit operates under a legal and regulatory framework specific to its location of operation. For instance, a manufacturing plant must abide by national or state pollution control laws that might constrain how much output it can produce in any given period. Thus, laws and regulations are also another determinant of labor productivity.

Broadly speaking, these four factors (the capital stock per worker, the level of technology, worker quality, and laws and regulations) have garnered the most attention from economists seeking to understand the determinants of labor productivity. Now let's turn to the evidence that suggests that

the degree of competition can also influence productivity through the choice of work rules.

COMPETITIVE PRESSURE AND THE PRODUCTIVITY OF IRON ORE PRODUCERS

The U.S. iron ore industry is located in the Midwest. Because iron ore is heavy and costly to transport, U.S. ore producers supply ore only to U.S. steel producers located in the Great Lakes region. Between 1979 and 1982, the U.S. economy experienced two recessions, almost back-to-back.⁷ This was also a period of depressed economic conditions in most of the industrialized world. As a result, world demand for steel fell sharply, and this decline hit the U.S. steel industry hard. The production of steel declined almost 50 percent between 1979 and 1982.

Since iron ore is used almost exclusively as an input in the production of steel, the shrinkage in the demand for steel led to a corresponding decline in the demand for iron ore. Indeed, the demand for iron ore fell about 50 percent as well. Furthermore, the decline in the world market for steel led to a scramble by ore producers all over the world to find new customers. In the process, despite the huge distances involved, Brazilian mines began shipping iron ore to steel producers in the Chicago area. Thus, both the shrinkage in the demand for iron ore and the appearance of a competitor led to increased competitive pressure on U.S. iron ore producers.⁸

The increase in competitive pressure coincided with a remarkable

⁷ In terms of the unemployment rate and loss of GDP, the recession in 1982 was the worst U.S. recession since World War II.

⁸ Galdon-Sanchez and Schmitz define increased competitive pressure as an increased likelihood of business failure.

change in the labor productivity of iron ore mines. As José Galdon-Sanchez and James Schmitz document, between 1965 and 1978, there was essentially no change in the labor productivity of U.S. iron ore producers. After 1982, labor productivity began to increase rapidly, and by the late 1980s, the productivity of U.S. iron ore producers had *doubled*.⁹ But coincidence does not imply causality. Perhaps labor productivity would have risen even without the increase in competitive pressure. To be sure that the increase in labor productivity resulted from increased competitive pressure, Galdon-Sanchez and Schmitz compared how the collapse of the world steel market affected ore producers in other countries. This comparison is informative because the collapse affected ore producers differently in different countries.

Excluding the United States (which was the third largest producer of ore in 1980 among non-Communist countries), iron ore is produced in significant quantities in seven other countries. In order of volume of production in 1980, these countries are Brazil, Australia, Canada, India, France, Sweden, and South Africa. Based on the average cost of ore production in each country and the location of a country's mines relative to its centers of steel production, Galdon-Sanchez and Schmitz sorted countries according to the degree of competitive pressure experienced as a result of the steel collapse. According to the authors' calculations, mines in Australia, Brazil, and India faced the

⁹ It's worth pointing out that there was no such dramatic shift in productivity growth at the national level. Output per hour in the nonfarm business sector rose at an annual rate of 2.2 percent between 1965 and 1978 and at an annual rate of 1.97 percent between 1983 and 1990.

smallest increase in competitive pressure, while mines in the U.S., Canada, France, South Africa, and Sweden faced the highest increase.¹⁰ When Galdon-Sanchez and Schmitz looked at how labor productivity evolved in each of these countries, they found that countries that faced the smallest increase in competitive pressure — namely, Australia, Brazil, and India — experienced the smallest increases in labor productivity after the steel collapse. All of the other countries

After 1982, labor productivity began to increase rapidly, and by the late 1980s, the productivity of U.S. iron ore producers had *doubled*. But coincidence does not imply causality.

experienced much higher increases in labor productivity.¹¹

Galdon-Sanchez and Schmitz present persuasive evidence that the increase in the labor productivity of U.S. mines was a consequence of increased competitive pressure. The next important question is how this increase was achieved. Remarkably, Galdon-Sanchez and Schmitz argue that the increase in the labor productivity of U.S. mines cannot be accounted for by changes in traditional

¹⁰ These calculations are based on cost, including freight of ores from various countries. For instance, mines whose basic cost of ore production is relatively low and whose distance from the closest center of steel production is small will face the smallest increase in competitive pressure. These mines will, in effect, be the mines of choice for some steel producers. Thus, shrinkage in the world demand for steel will affect low-cost, close-in producers the least while affecting the high-cost, far-out mines the most.

¹¹ The only exception to this pattern is France, where labor productivity declined steeply during the 1990s. Iron ore production is nonexistent in France at present.

determinants of labor productivity.¹² There were no improvements in technology or worker quality and no changes in regulations governing ore production. Capital stock per worker did rise, but the rise was not large enough to account for any significant proportion of the remarkable increase in labor productivity.

Galdon-Sanchez and Schmitz also investigated if mines were shifting into the production of higher quality ore (which would presumably fetch more

in the marketplace, thus boosting value-added and labor productivity), but they found no evidence of such a shift. They also determined that labor productivity did not go up because ore producers were shutting down low-productivity mines.¹³ In their words, the increase in labor productivity occurred in “continuing mines, producing the same products and using the same technology as they had before the 1980s.”

This, of course, raises the question as to what exactly happened in these mines. In a recent article, Schmitz investigated this issue in detail. It turns out that the increase in labor productivity resulted mostly from changes in *work rules*. In most cases, these changes involved an expan-

¹² This point is made in more depth in the recent article by Schmitz.

¹³ If an ore producer shuts down mines with low labor productivity, the producer's labor productivity will rise simply because there are fewer low-productivity mines pulling down the average labor productivity of the ore producer.

sion in the set of tasks a worker was required to perform. For example, the changes required equipment handlers to perform routine maintenance on their equipment. Before, this maintenance was the responsibility of repairmen. In addition, the new work rules insisted on a flexible assignment of work; that is, a worker was required to occasionally do tasks assigned primarily to another worker. In both cases, the new work rules led to better use of a worker's time.

To summarize, the evolution of the labor productivity of U.S. iron ore mines during the 1980s shows that labor productivity depends on more than just the stock of material means of production, worker quality, and regulations. It also depends on the work rules in place. Furthermore, work rules appear to be a choice variable. When competitive pressure is high, the production units choose work rules that enhance labor productivity.¹⁴

SCHOOL CHOICE, COMPETITIVE PRESSURE, AND SCHOOL PRODUCTIVITY

Let's turn now to another example of increased competitive pressure leading to higher productivity: public schools in Milwaukee. Since schools don't sell their "output" in the marketplace, the notion of labor productivity defined earlier is not directly applicable. In this context, we can take productivity to mean what taxpayers get for their money: average student achievement of a school divided by per pupil school expenditures.¹⁵

¹⁴ The reasons competitive pressure and labor productivity are linked are discussed later on in the article.

¹⁵ See Caroline Hoxby's article for a more detailed discussion of this measure and Theodore Crone's article for a discussion of student scores as a measure of school achievement.

The Milwaukee school district introduced school vouchers for poor students in the 1991-1992 school year. With a voucher, an eligible student could go to a private school and have about \$5000 of tuition costs reimbursed. The public school district that lost the student would lose about 29 percent of its per pupil revenue. Although many students were eligible for vouchers, the number of vouchers given was capped at 1 percent of public school enrollment. After a long legal dispute, however, this cap was raised to 15 percent, starting with the 1998-1999 school year.¹⁶

As in the iron ore case, it's possible to classify Milwaukee public schools according to the degree of competitive pressure faced as a result of the voucher program. This classification is based on the fraction of students eligible for vouchers in a school district. Because eligibility depends on household income, this fraction varies widely. Some school districts had more than 90 percent of students eligible for vouchers and others as few as 25 percent. Caroline Hoxby classified school districts with at least 67 percent of students eligible for vouchers as being under the most competitive pressure, while those with less than 67 percent as being under moderate competitive pressure.

Hoxby compared school productivity (the percentile score of a school's fourth-grade class in different subjects per \$1000 of per pupil spending) for 1996-1997 (the last year before the

¹⁶ Hoxby studies the impact of this reform in detail because it satisfies three critical requirements: "(1) there is a realistic possibility that at least 5 percent of regular public school enrollment could go to choice schools, (2) the regular public schools lose at least some money when a student goes to a choice school, and (3) the reform has been in place for a few years." Clearly, (1) and (2) are necessary conditions for a reform to generate competitive pressure on a public school.

cap was raised to 15 percent) with school productivity in 1999-2000. She finds that school productivity rose 46 percent and 56 percent for math and science and 23 percent and 11 percent for social studies and language in the schools under the most competitive pressure. In contrast, schools under moderate competitive pressure showed increases of 10 percent, 45 percent, 10 percent, and 4 percent, respectively.

To be confident that the increase in school productivity was the result of increased competitive pressure, Hoxby compared the performance of Milwaukee schools with that of other Wisconsin schools that were not part of the voucher program. For this comparison, she selected Wisconsin schools outside of Milwaukee that resembled Milwaukee schools as much as possible. For this comparison group she found increases in school productivity — in math, science, social studies, and language — of 18 percent, 9 percent, and 4 percent, and a decline of 10 percent, respectively, between 1996-1997 and 1999-2000.

Thus, for every subject, the ranking by percentage increase in school productivity was identical. Schools under the most competitive pressure showed the greatest increase, schools under moderate competitive pressure showed the second largest increase, and schools under no competitive pres-



sure showed the smallest increase.¹⁷

What factors contributed to this increase in productivity? In her discussion, Hoxby notes some of the ways a school superintendent could raise the performance of his or her school. These include re-allocation of teacher effort toward basic skill-building classes such as reading and math and rewarding teachers whose students showed improvement in scores while letting unproductive staff go (i.e., moving to more performance-based compensation). Thus, it would appear that these increases in productivity were also the result of changes in work rules.¹⁸

¹⁷ Hoxby's findings have attracted a lot of attention. In a somewhat related study, Cecilia Rouse found that Milwaukee students who took advantage of the voucher program and transferred to private/parochial schools did only somewhat better in math and not at all in reading. Although students who left Milwaukee public schools are not Hoxby's focus, Rouse's findings have led some to question the usefulness of school choice as a way of raising student achievement. In a more recent study, Rajashri Chakrabarti has analyzed the impact of the Florida voucher program and re-affirmed the importance of voucher programs in providing incentives to improve school productivity.

¹⁸ However, the nature of the voucher program complicates this inference for the following reason. When a student uses the voucher program, the school that loses the student loses only 29 percent of per pupil revenue. Consequently, schools that lose students to the voucher program see an *increase* in the resources available per (remaining) pupil (provided, of course, the overall school budget does not change for some other reason). Increase in per pupil spending is akin to an increase in inputs, and that could be a factor in the improved performance of schools. Schools under the most competitive pressure did see an increase in average spending per pupil. This increase was about 6 percent. Over the same period, the comparison schools outside of Milwaukee saw an increase of 2 percent in per pupil spending. This suggests that spending per pupil in the schools under the most competitive pressure probably rose about 4 percent as a result of the voucher program. Of course, the price of education inputs probably rose over this period as well, so that the actual real increase in spending per pupil was less than 4 percent. Unless an increase of 4 percent or less in spending per pupil had a huge effect on school productivity, most of the increase in school productivity probably resulted from changes unrelated to the quantity of inputs.

WHY DOES COMPETITION AFFECT THE CHOICE OF WORK RULES?

The main lessons to be drawn from these two studies are that work rules are an important determinant of labor productivity and that work rules respond to competition. Why might this be so? Although the connection between competition and productivity may seem obvious, there is something to be gained from thinking carefully about it.

Thinking generally about the fact that more productive work rules are adopted under pressure suggests one of two things. First, it may be that more productive work rules are invented only when the need for such rules becomes acute. In other words, necessity may be the mother of invention in the case of work rules (as in so much else). Alternatively, the knowledge of more productive work rules may exist, but such rules are adopted only under pressure because workers view such rules with disfavor. In what follows, I will leave aside the issue of organizational innovation and consider only the second alternative in more detail. Therefore, I will focus on the case of relatively simple changes in work rules that raise labor productivity.

Why might workers view more productive work rules with disfavor? One possibility is that workers experience increased job insecurity as a result of such rules; that is, workers associate more productive work rules with a higher likelihood of job loss.¹⁹ Certainly, more productive work rules mean that any given level of output can be produced with fewer work-

¹⁹ This discussion draws heavily on the 2004 paper by James Schmitz and on the book by Stephen Parente and Edward Prescott. Parente and Prescott discuss barriers to the adoption of new technology (as opposed to work rules), but much of what they say is relevant for the choice of work rules as well.

ers. With no change in a firm's sales, adopting more productive work rules will result in some workers being laid off. Workers as a group may then resist adopting the rules until a crisis threatens business failure and the loss of *all* jobs. Then, the more productive work rules will be adopted because doing so saves some jobs that would otherwise be lost.

But one must ask under what circumstances workers can actually resist more productive work rules. Three conditions must be satisfied. First, if owners (or their representatives, the managers) can unilaterally dictate work practices, they can insist that more productive work rules be adopted. Because such rules increase profits — at a minimum, the firm can produce the same output with fewer workers and hence at lower cost — owners obviously have an incentive to do so. Thus, for there to be any resistance at all, the right to dictate work practices must reside partially with workers.

Second, a *new* firm does not have to face established employees worried about job security and can therefore adopt the more productive work rules. If workers in established firms do not have the right to dictate work rules in new firms, and if the threat of competition from new entrants is sufficiently real, workers in established firms will feel compelled to adopt more productive work rules as soon as these rules become known.²⁰ Thus, the threat of a new entrant with more productive work rules must be low or nonexistent.

Finally, it must be in workers' interest to resist more productive work rules. That depends on whether the firm can sell the additional output — delivered by an unchanged number

²⁰ Entry by a more efficient competitor is like a crisis: It threatens business failure and the loss of all jobs.

of workers using more productive work rules — without precipitating a large drop in price. If the firm is a small player in a big market, the increased production may cause little or no drop in price. In this case, the firm's revenue will go up without any increase in costs. By passing on some of the additional revenue to workers, the firm can induce workers to accept the more productive work rule. Thus, for job security to be an issue, the firm must be large relative to the market it serves.

These three conditions — the worker's right to partially dictate work rules, barriers to entry by new firms, and large firm-size relative to market — are features of monopolistic industries.²¹ Thus, workers in monopolistic industries may have the ability and the incentive to resist productive work rules for job security reasons. The mining example certainly fits this pattern. Work practices in the midwestern mines were partially under the control of labor unions, so managers could not unilaterally dictate work practices. The high cost of shipping iron ore over long distances kept the threat of entry by new firms low. Finally, the midwestern mines were big relative to their market — there being only a handful of mines serving the Great Lakes steel producers. Thus, loss of job security could explain why miners resisted more productive work rules until the steel crisis broke that resistance down. Indeed, when these rules were adopted, the mines eliminated a significant number of jobs.

²¹ Strictly speaking, a fourth condition must also be met. One must ask why a firm with too many workers doesn't buy its excess workers out — paying for the buyout from future reductions in operating costs. Schmitz observes that a firm's ability to finance the buyout will depend on its borrowing capacity. But because a firm has the option to default on its debt, the amount it can credibly borrow may not be sufficient to cover the cost of a full buyout. Consequently, it may not be possible to buy out all excess workers.

But loss of job security cannot be the reason some Milwaukee public schools had poor student achievement prior to the voucher program. Better student scores would have led to teachers being lauded rather than being laid off! To understand this example, we must consider the possibility that workers may view more productive work rules with disfavor because such rules demand more effort and therefore feel more onerous. This possibility seems natural if we recall

Workers in monopolistic industries may have the ability and the incentive to resist productive work rules for job security reasons.

that labor productivity is determined by the volume of work handled by a worker. Since a higher volume of work — with no change in technology or capital stock per worker — is likely to be associated with a higher level of work intensity, work rules that promote higher labor productivity may well feel more onerous to workers.

But, again, we must ask under what circumstances would workers have the ability to resist more onerous but more productive work rules and whether they would have an incentive to do so. Let's assume that workers have the right to at least partially dictate work practices and that the threat of entry by new firms with more productive work rules is low or nonexistent. Then workers would certainly be able to resist changes in work rules. Further, let's assume that workers do not fear the possibility of job loss from adopting the work rule — the firm is a small player in a big market.

Because work rules are onerous, workers would want additional compensation to offset the costs associated with adopting the rule. If the maximum additional compensation

that owners can pay is less than the minimum workers will accept, the rule would not be adopted. The additional compensation demanded by workers will depend importantly on what happens if the rule is not adopted. If the refusal to adopt results in both workers' and owners' carrying on as before, there will be less urgency on the part of workers to adopt the rule. In such circumstances, workers will be aggressive in their demand for additional compensation, and the rule may not be

adopted. On the other hand, if the refusal to adopt results in an impairment of the firm's ability to compete and thereby raises the likelihood of layoffs or business failure, workers would be less aggressive in their demand, and the rule is more likely to be adopted.²²

This logic can make sense of the voucher program's effect on Milwaukee public schools. Since teachers unions partially dictate work practices, one of the preconditions for resistance to changes in work rules is certainly met. By its nature, entry into the "market for public schools" is restricted, so the

²² For readers familiar with the theory of bargaining, I should point out that (Nash) bargaining will lead to an efficient outcome. That is, all work rule changes that are sufficiently productive would be adopted, and workers would be adequately compensated for putting up with the rules. But the requirement of efficiency does not pin down the compensation work rule package because there are many efficient packages. Which efficient package is picked will depend on the outside options of workers and owners. When workers' outside options deteriorate, the bargaining will move the compensation work rule package in the direction that makes workers worse off and owners better off; that is, compensation will fall and work rules will become more onerous.

second pre-condition is also met. Before the voucher program was set up, the incentive to adopt work practices that improved school performance was weak because failure to adopt meant the status quo. But by giving a significant fraction of students the option to withdraw from poorly performing schools, the voucher program linked a school's nonperformance to loss of resources and, possibly, jobs.²³ Since improvement in school performance would presumably obviate the need for parents to switch schools, there was now a stronger incentive to adopt work rules that enhanced school performance.

IMPLICATIONS FOR RECENT PRODUCTIVITY AND COMPENSATION TRENDS

So far the discussion has emphasized workers' right to partially dictate work practices and the low threat of entry by new firms as two important pre-conditions for workers to successfully resist more productive work rules when they have an incentive to do so. But the workers' "right" to dictate work practices and barriers to entry by new firms are, to some degree, features of every U.S. industry. Although the bulk of the U.S. workforce is not unionized, workers exert considerable influence on the choice of work rules because a business can ignore worker preferences concerning work practices only at the cost of (excessive) employee turnover. Similarly, while most U.S. industry is generally open to competition, established firms in any industry wield considerable advantage over new entrants, an advantage that constrains how well new entrants can compete with established firms. Thus, the choice of work

²³ Withdrawal of a sufficiently large number of students would result in the loss of teaching positions and, therefore, in the loss of jobs for some teachers.

rules will be influenced by the "bargaining strength" of workers to some degree in every industry. When that bargaining strength is weakened, there will be a tendency for more productive work rules to be adopted.

Competitive pressure and the choice of work rules may be relevant in understanding recent productivity and compensation trends in the U.S. As noted earlier, the U.S. economy has experienced significantly faster growth

By giving a significant fraction of students the option to withdraw from poorly performing schools, the voucher program linked a school's nonperformance to loss of resources and, possibly, jobs.

in labor productivity since 1995. Interestingly, between 1995 and 2000, the growth rate of output per hour in the nonfarm business sector was roughly matched by the growth rate of hourly compensation, adjusted for inflation, in this sector.²⁴ Economic theory predicts that productivity growth that is due to the diffusion of new technology should result in a comparable increase in the growth rate of compensation per hour. Since this is what happened, neither the pickup in productivity growth nor the pickup in compensation per hour is mysterious. Both are generally attributed to the diffusion of new technologies.

²⁴ Output per hour grew at an annual rate of 2.2 percent, while hourly compensation grew at an annual rate of 2.0 percent.

Since 2001, however, the situation has been quite different. The growth rate of worker compensation per hour has not kept pace with the growth rate of labor productivity.²⁵ Why has this happened? One possibility is that the recession, by raising the likelihood of business failure, weakened workers' resistance to more productive work practices. This would explain why productivity has risen without a comparable increase in labor compensation. But a more important force working in the same direction is the ongoing diffusion of modern technology to countries outside the developed world. This diffusion is gradually increasing the threat of entry by new low-cost producers in many lines of business, a trend that has become particularly noticeable since the late 1990s. Perhaps this development is also contributing to a weakening of worker resistance to more productive work practices.

It's worth noting that regardless of the reasons for worker resistance to more productive work practices, some workers are made worse off by the adoption of such rules. Thus, the benefits stemming from improved labor productivity must be set against the loss experienced by some workers. It's natural, then, to wonder whether this offset completely swamps the benefits. Historically, improvements in labor productivity have served as the foundation for a general improvement in the standard of living, even when the improvements initially affected some portion of the population adversely. There is no reason yet to think that the same will not be true of the ongoing improvements in labor productivity.

²⁵ Over these three years, output per hour in the nonfarm business sector rose at an annual rate of 3.8 percent, while hourly compensation rose at an annual rate of only 1.5 percent.

CONCLUSION


The concept of labor productivity is an important one in macroeconomics. Economists who study the determinants of labor productivity generally focus on the positive role of the capital stock (the material means of production), the level of technology embedded in that stock, worker education, and laws and regulations. Two recent research studies suggest that this list ought to be amended to include the choice of work rules as well. These two studies — one dealing with the productivity of iron ore mines and the other with that of public schools — clearly demonstrated that an increase in competitive pressure can lead to adoption of work rules that enhance labor productivity.

The studies used a very similar methodology to make their case. The first step was to identify an event that led to increased competitive pressure on production units. In the case of the midwestern iron mines, it was the collapse of steel production in the early 1980s; in the case of the Milwaukee

public schools, it was the introduction of a voucher program. The next step was to sort production units (mines and public schools) by the degree of increased competitive pressure faced as a result of that event. Then, in the final step, the change in pre- and post-event labor productivity of the production units that faced the most increase in competitive pressure was compared with the change in pre- and post-event productivity of units that faced the least increase in competitive pressure. Both studies found that labor productivity grew most in the units that faced the most increase in competitive pressure.

If adopting more productive work rules had no adverse consequences for workers, it would be hard to understand why a more productive work rule would not be adopted as soon as workers or owners think of it. The fact that such rules are adopted under pressure suggests that workers lose something from adopting such rules. More productive work rules may result in loss of jobs, and workers, understandably,

resist such rules. Alternatively, more productive work rules may require workers to handle a greater volume of work, a situation that may make such rules seem onerous. These reasons could explain why productive work rules are not adopted until increased competitive pressure forces workers to relent.

Competitive pressure on a business goes up when it experiences a decline in demand for its product. Such declines can happen during a downturn or when the firm encounters new low-cost rivals vying for customers. Since 2000, we have seen both. There was a recession and increased competition from firms in the developing world. Arguably, these developments may account for why the pace of productivity growth has risen and why the pace of labor compensation growth has slowed since 2000. For this reason, the evidence on the role of competitive pressure in labor productivity reviewed in this article is noteworthy and relevant. 

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How Do Local Labor Markets in the U.S. Adjust to Immigration?

BY ETHAN GATEWOOD LEWIS

In recent years, more than 1 million people a year have immigrated to the U.S., a level not seen since before the Great Depression. This boom is most apparent in the urban areas where immigrants tend to cluster. Given their numbers, these newly arrived residents must have some effect on local labor markets. Yet economists have been puzzled by the evidence that immigration has little impact on the wages and employment of native-born workers. So how great is immigration's impact on local labor markets? Is it limited to markets where immigrants settle, or is it spread across the country? Ethan Lewis sifts through the theory and evidence to answer these questions.

Since the 1960s, the number of foreign-born people living in the U.S. has risen rapidly. At present, over 1 million people immigrate to the U.S. each year (both legally and illegally),¹ a level not seen since before the Great Depression.² This boom is most apparent in the urban areas where immigrants tend to cluster: Foreign-born residents now make up 60 percent of the population of Miami and large pluralities of the population of other

major gateway destinations such as New York, Los Angeles, and Chicago (Table). There are at least some immigrants in all parts of the U.S., however. In the Third Federal Reserve District, Philadelphia is the top destination for the foreign-born, followed by Trenton, Wilmington, Atlantic City, and Allentown. In addition, immigration to some cities that had few immigrants not long ago has been increasing rapidly in recent years, especially in the South.

In a recent *Business Review* article, Albert Saiz discussed immigration's impact on U.S. cities. The evidence suggests immigrants have surprisingly little impact on the wages and employment rates of similarly skilled native-born workers in the same labor market. On the other hand, Saiz's research

shows immigrants bid up the price of housing, and thus immigration may still affect the "real" disposable income of native-born workers, at least in the short run.³ In one study, Saiz showed that rents in Miami jumped up and remained high for up to four years after a large influx of mostly less-skilled Cuban refugees to Miami in 1980 (the Mariel boatlift). The impact was largest for rental units of lower quality than one would expect the Cuban refugees to occupy; so the real disposable income of less-skilled workers in Miami fell. Saiz's article also discusses

¹ These data come from the 2000 U.S. Census of Population. To the extent that illegal immigrants are not willing to respond to government surveys asking people where they were born, this may understate the total number of immigrants. However, the U.S. Census Bureau takes great pains to make clear that responses to their surveys are, by law, confidential (and cannot be given to other government agencies). In addition, the Bureau uses statistical methods to correct for nonresponse. There is also some evidence that the census captures many illegal immigrants: the number of self-reported immigrants is much larger than the number of legal visa holders in the U.S.

² The last big wave of immigration, at the turn of the 19th century, occurred at a time when there were few (legal) restrictions on immigration. Though that wave was almost as large in numbers as the current wave, the U.S. population was much smaller; therefore, the impact was proportionately greater. During the current wave, however, population *growth* among native-born Americans is much lower than at the turn of the 19th century. As a result, the foreign-born share of the population is growing faster now. Another period in which immigration rapidly transformed the U.S. population was in the decades before the Civil War, when masses of Irish and other northern European immigrants settled in the U.S.

³ In the long term, construction of new housing units or out-migration of people unwilling to pay the higher rents is expected to diminish the impact of any short-term crunch in housing availability.



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TABLE

Top Destinations of Working Age* Immigrants in the 1990s

Metro Area	Number of Immigrants in the 1990s	% of Area's Population		Share of 1990s Immigrants	Share of Native Born
		1990s Immigrants	All Immigrants		
1 New York, NY	1,016,309	17.2%	41.9%	10.2%	2.3%
2 Los Angeles, CA	909,483	15.3%	47.8%	9.1%	2.0%
3 Chicago, IL	493,585	9.5%	22.1%	4.9%	2.7%
4 Houston, TX	317,918	11.8%	26.5%	3.2%	1.3%
5 Miami-Hialeah, FL	310,981	22.4%	61.4%	3.1%	0.4%
6 Washington, DC	308,940	9.5%	21.0%	3.1%	1.7%
7 Dallas, TX	261,997	11.1%	21.3%	2.6%	1.2%
8 Orange County, CA	241,899	13.4%	38.2%	2.4%	0.7%
9 San Jose, CA	205,785	18.6%	42.4%	2.1%	0.4%
10 Atlanta, GA	205,030	7.5%	12.9%	2.1%	1.6%
Top 10 Metro Areas	4,271,927	13.2%	33.1%	42.8%	14.3%
Top Third District Metropolitan Areas					
22 Philadelphia, PA	100,715	3.5%	8.7%	1.0%	1.7%
73 Trenton, NJ	17,909	8.1%	17.6%	0.2%	0.1%
97 Wilmington, DE	12,969	4.1%	8.2%	0.1%	0.2%
102 Atlantic City, NJ	11,983	5.5%	11.8%	0.1%	0.1%
121 Allentown, PA	8,574	2.2%	6.4%	0.1%	0.2%
Entire Third District**	199,636	2.7%	6.7%	2.0%	4.5%
Entire U.S.	9,979,417	5.7%	14.0%	100.0%	100.0%

Data source: 2000 Census of Population public-use microdata.

*Age 16-65 and completed school, regardless of grade level attained. Calculations include only working age native-born Americans and immigrants.

**Approximate boundaries.

the impact of immigration on government finances and crime.⁴

In this article, I take a closer look

⁴ Immigration may also have other social impacts, some good and some bad. For example, Harvard professor Samuel Huntington's recent book argues that immigration poses a threat to American culture and national identity. A different view is presented by economists Giovanni Peri and Gianmarco Ottaviano. They show that Americans value the cultural diversity that immigration generates. They find evidence that Americans are willing to pay more to live in a city after it receives an unexpected inflow of immigrants.

at how local labor markets in the U.S. are adjusting to the immigration boom. The evidence that immigration has little impact on the wages and employment rates of native-born workers has puzzled economists, whose theories suggest there should be a larger impact, and it has raised a number of questions. Why is immigration's impact on the local labor market so small? Has the impact been limited to the markets where immigrants settle, or is it spread across the country (and if so, how)?

THEORY AND EVIDENCE ON LOCAL LABOR MARKET COMPETITION

Two Views. A common negative view of immigration is that immigrants take jobs from native-born Americans, often expressed in terms that imply there is a one-for-one transfer of jobs from Americans to immigrants. For example, Federal Reserve Chairman Alan Greenspan was asked during congressional testimony: "If we have

8.4 million unemployed, according to our official statistics, and if 6 million illegal immigrants are working, are these 6 million taking the jobs that the 8.4 million want? Also, if these 6 million were not here, would we suddenly have virtually full employment?"⁵

Another extreme, but more positive, view is that immigrants largely find employment in jobs that native-born Americans would not take. New York Congressman Emanuel Celler, a sponsor of the 1965 immigration reform legislation that is thought to have contributed to the current wave of immigration, once said, "You couldn't conduct a restaurant in New York...if you didn't have rough laborers. We haven't got the rough laborers anymore...Where are we going to get the people to do that rough work?"⁶

There may be a grain of truth to the view that immigrants take jobs natives "don't want." For one thing, immigrants are disproportionately less skilled: Almost 40 percent of immigrants (and less than 20 percent of native-born Americans) are high-school dropouts (Figure 1). Related to this, many immigrants work in jobs that are rarely taken by native-born workers. There are, for example, more house-

hold service workers in high-immigration areas, suggesting that immigrants are more willing to take these jobs than native-born workers.

An immigration expert at the University of Texas-Austin, Stephen Trejo, has shown that minimum wage immigrants and natives often

there turns out to be sufficient overlap in the occupations of immigrants and native-born workers that we would expect to see substantial labor market competition between them. For one thing, many native-born Americans do take less-skilled jobs. It is also worth remembering that a substantial frac-

A more general view, and one supported by economic theory, is that immigrants and native-born workers who have similar skills compete with each other.

work in quite distinct occupations and industries. On the other hand, the fact that immigrants and natives hold different types of jobs does not, by itself, prove that immigration's impact on native-born workers is small. Another possibility is that immigrants have driven native-born workers out of certain types of jobs. In addition,

tion of immigrants seek high-skill jobs; for example, a larger proportion of immigrants have advanced degrees than do native-born Americans (Figure 1).

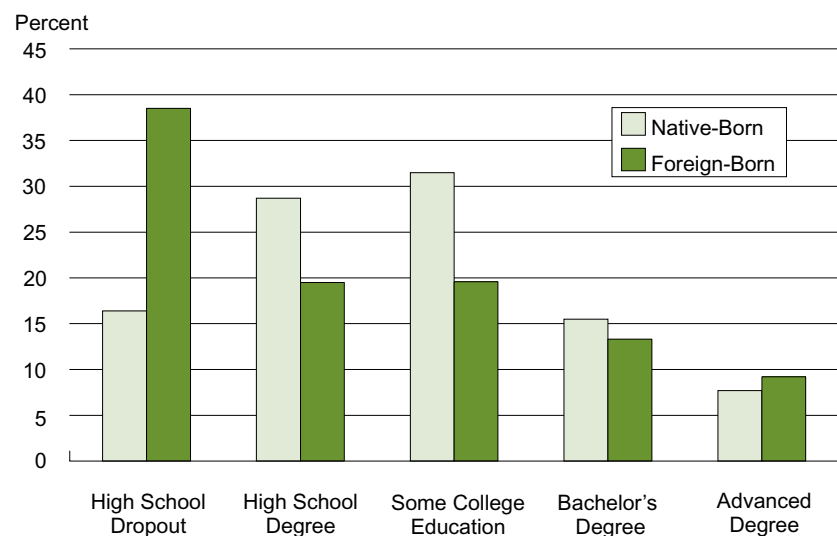
Economic Theory. A more general view, and one supported by economic theory, is that immigrants and native-born workers who have similar skills compete with each other.

⁵ Tennessee Senator Lamar Alexander asked Greenspan this question in Greenspan's appearance before the Joint Economic Committee on April 21, 2004 (quote obtained from the *Congressional Record*). The larger question was how accurate official unemployment figures are. Greenspan is reported to have replied that getting information about how many illegal aliens are working in the U.S. has "bedeviled statisticians." The view that immigrants take jobs was expressed more explicitly by a labor department official testifying before Congress in 1973: "I think it is logical to conclude that if they [immigrants] are actually employed, they are taking a job away from one of our American citizens." (Quote from *Public Interest*, Winter 1975, and Ronald Ehrenberg and Robert Smith's labor economics textbook, p. 353.)

⁶Quote obtained from the Winter 1975 issue of *Public Interest*.

FIGURE 1

Skill Distribution of Working Age* Native-Born and Foreign-Born U.S. Residents, 2000



Data source: 2000 U.S. Census of Population.

*Age 16-65 and completed school, regardless of grade level attained.

In addition, economists expect immigration to have a long-run impact only if the immigrants have a different mix of skills than native-born workers. To see why, suppose immigrants had the same mix of skills as natives. If so, immigrants could eventually be employed in a “replica” of the existing economy: skilled and unskilled workers would still perform the same tasks (and, hence, get paid the same wages) but would work in a proportionately larger economy.⁷ If immigrants were disproportionately unskilled, in contrast, businesses in high-immigration markets might find it difficult to find productive tasks for all of them to do. As a result, they would be willing to hire immigrants only if wages for unskilled workers fell.

In reality, immigration tends to increase the relative number of less-skilled workers (Figure 1). (This is not true everywhere. Some markets attract a disproportionate number of high-skill immigrants.) Thus, in most cases, we expect immigration to reduce the wages of less-skilled native-born workers relative to the more skilled. If there are impediments to the adjustment of wages, such as minimum wage laws, we expect immigration to increase unemployment among less-skilled native-born workers.

Evidence. Returning to the question asked of Chairman Greenspan, it should be clear that we should not expect immigrants to displace native-born workers one-for-one. Instead, if economists’ views are correct, labor market competition from immigrants will lead to some displacement and some fall in the relative wage rate

⁷ This ignores where the buildings and machinery to employ the immigrants would come from. In the short run, therefore, even this skill-balanced type of inflow could reduce wages and employment.

of less-skilled native-born workers.⁸ To test this view, researchers have exploited the fact that immigrants tend to locate in certain labor markets more than others. For example, of the 10 million working-age immigrants who came to the U.S. during the 1990s, over 40 percent settled in just 10 metropolitan areas (Table). In contrast, only 14 percent of native-

If economists’ view of immigration’s impact on the labor market is correct, one might expect to find that relative wages are lower and unemployment rates higher for less-skilled workers in the high-immigration areas.

born Americans live in those same metro areas. In the average of these top 10 metro areas, immigration in the 1990s amounted to 13 percent of the area’s population, and in Miami, recent inflows amounted to over 20 percent of the population. In contrast, in other parts of the U.S., the immigrants who came during the 1990s made up less than 6 percent of the local population on average. If economists’ view of immigration’s impact on the labor market is correct, one might expect to find that relative wages are lower and unemployment rates higher for less-skilled workers in the high immigration areas.

The evidence suggests that local labor market competition between immigrants and natives, while present, is not very strong (see *Does Immigration Harm the Labor Market Outcomes of Native-Born Workers?*). Economists find that wages and employment rates

⁸ The relative wage means the ratio of the average wage of less-skilled workers over the average wage of other types of workers.

for less-skilled workers in an area do not fall by much in response to an immigrant inflow to that area. In a typical estimate, a 10 percent increase in the proportion of workers in an area who are less-skilled reduces the wages of low-skill workers relative to those of high-skill workers in the area less than 1 percent.⁹ Even competition from immigrant workers in the same occupa-

tion seems to have little impact on the relative wages and employment rates of native-born workers in that occupation. In one study, economist David Card of the University of California-Berkeley, divided all occupations into six broad skill classes. He found that in the average metropolitan area, the wage in a given occupation class relative to the wage in other occupation classes was diminished only slightly by an unexpected inflow of immigrants seeking jobs in that class of occupations. The impact on the local unemployment rate was also small.¹⁰

⁹ A 10 percent increase in the proportion of workers who are dropouts is not large in comparison to the variation across U.S. cities. For example, the proportion of workers in Los Angeles who are dropouts is roughly twice that in the rest of the nation.

¹⁰ In a recent article, economist Madeline Zavodny examined the impact of *high-skill* immigrants. She demonstrated that immigrants admitted to the U.S. to fill positions requiring skilled workers (those with H1-B visas) have little impact on the wages and employment rates of native-born information technology workers in the states where they work.

Does Immigration Harm the Labor Market Outcomes of Native-Born Workers?

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oes labor market competition from immigrants harm native-born workers? Most estimates indicate that immigration's overall impact on the labor market is

positive (but small). This small impact essentially derives from the fact that immigrants tend to be disproportionately less skilled relative to native-born workers (Figure 1), so immigration tends to make skilled labor relatively "scarce," driving up the wage of the typical native-born worker.^a On the other hand, less-skilled native-born Americans do potentially face labor market competition from immigrants, and the average impact hides the fact that immigration may harm less-skilled native-born workers while benefiting skilled workers.

Since many immigrants are relatively unskilled by U.S. standards, much (though not all) of the research on immigration's impact on the labor market has focused on measuring the impact of immigration on less-skilled native-born workers. Economists disagree about the size of this impact.^b Harvard economist George Borjas found that over the past 40 years, periods of high immigration were associated with somewhat slower growth in the relative wages of native-born workers who have levels of education and work experience similar to the immigrants'. Borjas's argument says that the large influxes of less-skilled immigrants during the 1980s contributed to the fall in the wages of less-skilled workers in that decade. On the other hand, research that exploits the geographic variation in the volume of immigration (Table) consistently finds little association between changes in the density of immigrants in a locality and changes in the relative wages of less-skilled Americans in that locality.

A legitimate concern about comparing labor markets

with different amounts of immigration is that job-seeking immigrants might choose to settle in markets where wages and employment are high or growing. If so, comparing changes in the wages of less-skilled workers (or unemployment) in areas that experienced high inflows of immigrants with other areas might understate immigration's true impact. (Wages might not be lower per se, but they might be lower than they otherwise would have been, something not easily observed.)

To get around this problem, economists have relied on the fact that not all immigrants settle in particular locations for economic reasons. Some come to settle with family, for example. When one attempts to study the impact of immigrants who settle in a particular location for "noneconomic" reasons, one still tends to find little local impact. A famous example of this is an investigation by David Card of what happened to the Miami labor market as a result of the influx of Cuban refugees during the Mariel boatlift. Miami is a traditional Cuban stronghold because of its closeness to Cuba, and the Mariel boatlift happened suddenly for reasons that had nothing to do with labor market conditions in the city.^c Thus, the event provides a reasonable "experiment" to tell us what immigration does to a local labor market. Card found that the event had little adverse impact on the labor market outcomes of Miami's existing less-skilled workers, even though the Cuban refugees increased enormously the availability of less-skilled labor in Miami (and did so in a short period of time). To reconcile the finding of some national impact and little local impact, Borjas suggests that the impact of immigration is dispersed throughout the U.S., not merely limited to the particular markets where immigrants settle.

^a An additional impact comes from the fact that the native born are more likely to own "capital" – buildings and machinery – which also become relatively "scarce" with an influx of labor.

^b More details can be found in the 1994 review by George Borjas and the review by Rachel Friedberg and Jennifer Hunt.

^c A long-running political dispute between Fidel Castro, the Cuban exile community, and the Carter administration culminated in an announcement by Castro in early 1980 that Cubans were free to leave the island. Over 100,000 took him up on the offer.

IS IMMIGRATION'S IMPACT DISPERSED?

One possible reason for immigration's small impact on the local labor market is that its effect is dispersed throughout the country, including places where very few immigrants settle. This could happen in a combination of two different ways. First, competing native-born workers might move away from high-immigration areas to avoid job market competition. If they left, they would bring employment competition to their new destinations. Second, because goods and some services are traded between different locations in the country, competition between producers in different locations could force wages to be the same everywhere. If this were true, immigrants would not lower wages disproportionately in the particular markets in which they settle. They could, however, lower wages in the U.S. as a whole.¹¹ This view says local markets adjust to less-skilled immigrants by specializing in making goods that require an abundance of less-skilled labor (apparel, for example). Similarly, markets adjust to the arrival of skilled immigrant workers by specializing in goods and services that require an abundance of skilled labor. The result is that the local impact of immigration is small.

Native Flight. Native-born workers may resist local labor market competition from immigrants by moving away. When they relocate, they bring job competition to their new locations. In the extreme, any local wage decline induced by immigration disappears because native-born workers relocate to other areas until the wage paid in the high-immigration market and other

¹¹ In a more extreme version of this view, world competition would force wages to be the same in all countries. In this case, immigration does not affect wages even at the national level.

locations is the same. If natives were mobile enough, immigration's impact on wages or employment would be spread across the U.S.

Though compelling in theory, in practice this seems unlikely to be how local labor markets adapt to immigration. For openers, evidence suggests that workers are slow to respond to changes in wages and unemployment rates in different locations. Two prominent economists, Olivier Blanchard of

Recent debates about outsourcing make it clear that workers need not be physically located in an area for job competition to exist.

MIT and Lawrence Katz of Harvard, have studied whether workers respond to unexpected declines in employment in a state by moving out of the state. They find that workers are slow to respond. According to their estimates, unemployment remains higher and wages lower for up to eight years after an unexpected fall in employment in a state.¹²

In addition, a number of researchers have investigated the question of whether native-born workers respond to immigration in their area by moving away. Some research shows that natives avoid high-immigration areas. An article by three Harvard economists (George Borjas, Richard Freeman, and Lawrence Katz) provides some support for this view.¹³ However, their results

¹² Employment dynamics are similar in a small sample of metropolitan areas for which the authors can get data for several years.

turn out to be very sensitive to the method of estimation. Other examinations of this question whose results are less sensitive to the method of estimation tend to find little support. David Card and University of Michigan professor John DiNardo showed that during the late 1980s, native-born workers, if anything, had a slight tendency to relocate to the same metropolitan areas as the immigrants with whom they would be expected to compete for jobs.

Local Specialization. Recent debates about outsourcing make it clear that workers need not be physically located in an area for job competition to exist. Similarly, trade between locations within the U.S. can spread immigration's impact across the country without the need for workers to relocate.

To see how, let us take a theoretical example. Imagine that the arrival of less-skilled immigrants in some city lowered the wages of less-skilled workers in that city alone. As a result of lower wages, that city would be able to produce all goods more cheaply, giving it a competitive advantage in trade with other markets. The advantage would be strongest for those goods – such as textiles and apparel – for which the wages paid to less-skilled workers were a large part of the cost of producing the goods. The high-immigration city would thus be able to gain national market share in sales of such so-called less-skill-intensive goods, provided transportation costs or other barriers to trade were not substantial. (See *Factor Proportions Theory*.)

According to this theory, in the long run, immigration of less-skilled workers to a city brings about two changes. First, the cheaper goods com-

¹³ Support also comes from the work of University of Michigan demographer William Frey, who has written extensively on what he calls the demographic "balkanization" of the U.S. or the "new white flight."

Factor Proportions Theory

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arkets that trade freely with one another will have the same wages in the long run, according to the factor proportions theory. This theory states that immigration should not have any local impact on wages. Instead, immigration to some location will induce firms in that location to make more of

the goods that require a large proportion of the type of labor that immigrants disproportionately supply (usually less skilled). The additional goods are sold on the world market.

This theory has limitations. The first is that it holds only to the extent that goods and services are traded between markets.* Goods and services that cannot be sold outside the location in which they are made – house cleaning, for example, or child care – play no role. Barriers to the free exchange of goods between locations, such as the cost of transporting goods, make it harder for wages to be equalized by this mechanism. Finally, the theory may not hold if there are other differences between locations (besides the number of immigrants). Among other things, the theory requires that the technology used to produce goods in each location be the same.

As it turns out, there is little evidence that this theory describes how the world works in practice. It fails to correctly predict the patterns of trade between countries, for example, and its prediction that wages will become equal in all countries does not appear to be true. Barriers to trade and differences in technology across countries are held responsible for the failure. This has not stopped researchers from speculating that the theory should hold within the U.S., which may not be completely unreasonable: Differences in technology and barriers to the exchange of goods may be smaller within the U.S. than between countries.

To demonstrate that this theory could hold inside the U.S., two economists who specialize in trade, University of California-San Diego professor Gordon Hanson and Dartmouth professor Matthew Slaughter, showed that changes in the technology used by different industries were similar in several large U.S. states during the 1980s. They reasoned that since technological changes are similar in different locations, we can credibly infer that the U.S. economy is integrated enough for the theory to hold.

However, Hanson and Slaughter ignored differences in technological change across states that occurred equally in all industries before making the comparisons in their analysis. In her Ph.D. dissertation, Joelle Saad-Lessler demonstrated that these economy-wide differences in technological change are related to the changes in the skills of the state's workforce. My own research found a similar relationship in U.S. metropolitan areas: When the skills of workers in a metropolitan area change because of immigration, the area adapts by choosing a technology that can employ the new mix of workers at similar wages.

* A traded service is one that can be carried out in one location and used in another. For example, lawyers often work for clients outside their own labor market.

ing from the high-immigration city put downward pressure on the wages of less-skilled workers in other locations. After adjustment, the difference in wages between the high-immigration city and other locations disappears. Second, the high-immigration city becomes more specialized in sectors producing goods that require a lot of unskilled labor. In theory, these sectors expand just enough to employ all of the new less-skilled immigrants, and the additional output is sold to consumers in other locations.¹⁴ Another interpretation of how a city adjusts to unskilled immigration, then, is that it “exports” the added labor to other locations in the form of goods that require a lot of unskilled labor.

Does the world actually work this way? Does immigration really induce local markets to produce more of the goods that use immigrants' skills intensively? To find out, in a recent paper, I looked at large metropolitan areas that were the top destinations for less-skilled immigrants during the 1980s (Los Angeles, Orange County, Fresno, Santa Barbara, Monterey, and Riverside in California, and Miami, Florida).¹⁵ Immigration greatly increased competition for less-skilled jobs in these cities. The proportion of workers who were less skilled, measured by the proportion of

¹⁴ It does not have to be the immigrants themselves who work in these sectors. Unskilled natives may move into these new jobs, while immigrants take other unskilled jobs.

¹⁵ This list of cities is different from the “top 10” in the table, in part because it is a different decade – the 1980s, not the 1990s – and the top immigrant destinations can change somewhat from one decade to the next. In addition, many immigrants are high skilled, as I noted earlier, and the skill mix of immigrants going to different cities is different. For example, New York and Chicago received a smaller proportion of less-skilled immigrants than this list of cities. Cities on this list also received skilled immigrants – many Cubans in Miami are highly skilled, for example – but these cities are distinctive because they attracted an unusually large proportion of less-skilled immigrants during the 1980s.

workers who were high-school dropouts, increased in these cities over the 1980s. This includes both immigrants and the native born, but the change appears to have been driven mainly by immigration, since in other parts of the country, the proportion of workers not holding a high-school diploma fell dramatically.

Labor market outcomes for less-skilled workers did not worsen disproportionately in these high-immigration cities. The wages and employment rates of less-skilled workers relative to skilled workers fell in these cities during the 1980s, but this occurred in almost equal magnitude in other parts of the country.¹⁶ This leaves open the possibility that the impact of immigration in these cities was dispersed to other parts of the country.

To find out if the high-immigration cities adjusted to immigration by specializing in making goods that require a lot of unskilled labor, we must first know how the high-immigration cities' mix of industries would have changed had the immigrants not come. I inferred this by looking at a group of comparison cities that did not receive so many less-skilled immigrants during the decade, but otherwise, the group was similar to the high-immigration cities at the beginning of the decade. In particular, the comparison cities had a mix of industries similar to that in the high-immigration cities in 1980. They also had workers with a similar skill mix and a similar unemployment rate for less-skilled workers (around 13 percent for high-school dropouts) in 1980.¹⁷

¹⁶ During the 1980s, the wages of low-skill workers relative to high-skill workers fell 22 percent in the high-immigration cities, 20 percent in the comparison cities, and 26 percent in the U.S. as a whole. Economists have hotly contested why wages for less-skilled workers fell in the U.S. during the 1980s. Explanations include technological change, immigration, competition from developing countries, decline in unionization, and a fall in the real value of the minimum wage.

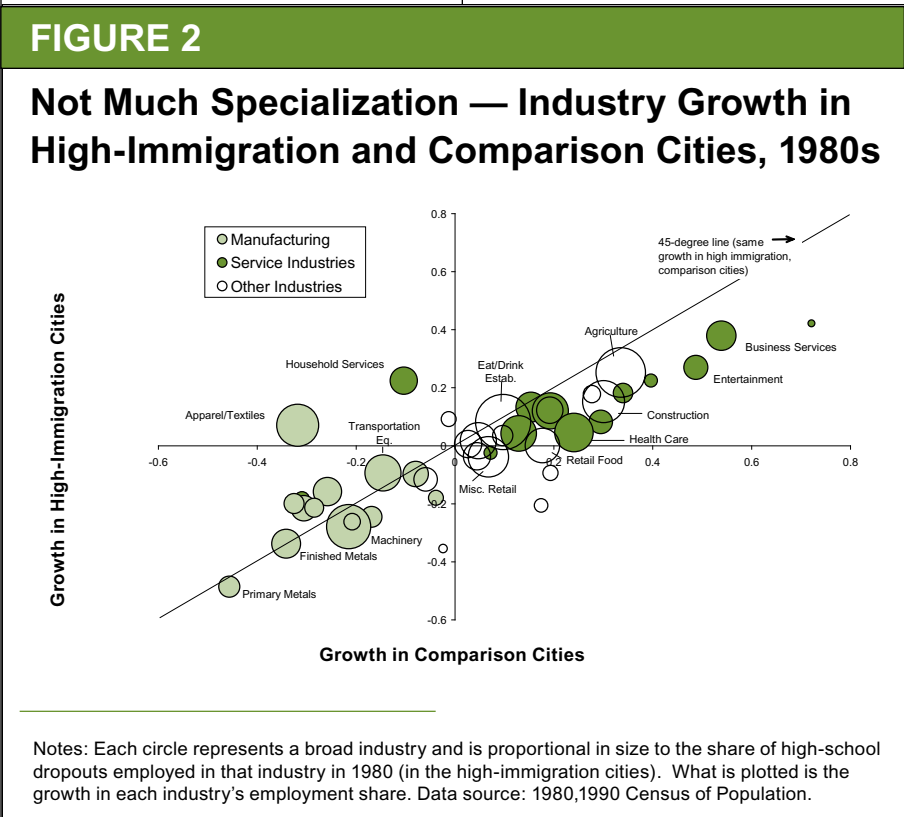
¹⁷ For the curious, the comparison cities include

We can see how the industry mix of the high-immigration cities changed relative to that of the comparison cities during the 1980s (Figure 2). Each circle in the figure plots the growth in the employment share of an industry in the high-immigration cities (vertical axis) against the growth in the employment share of the same industry in the comparison cities (horizontal axis). All of the circles would be plotted on the diagonal line if each industry grew by the same amount in both groups of cities. Circles above the line grew by more in the high-immigration cities than in the comparison cities; circles below the line grew by less in the high-im-

three western cities (Oakland, CA; San Diego, CA; Portland, OR) five northeastern cities (Bergen-Passaic, NJ; Newark, NJ; Nassau-Suffolk, NY; Somerset, NJ; Philadelphia, PA), three mid-western cities (Kansas City, MO; St. Louis, MO; Cincinnati, OH), and one southern city (Nashville, TN). Most of these cities also attracted substantial numbers of immigrants during the 1980s, but the impact on the skill mix of their workers was considerably smaller.

migration cities than in the comparison cities. The size of the circle shows the proportion of all high-school dropouts the industry employed in 1980. Large circles represent industries that employed a large percentage of less-skilled workers; for example, eating and drinking establishments employed 9 percent of high-school dropouts in 1980.

Notice that most of the points in Figure 2 are near the diagonal line, indicating that the industries grew by the same amount in both sets of cities. However, there are some interesting outliers. Apparel and textiles grew much more rapidly in the high-immigration cities than in the comparison cities. This difference was so large that the apparel and textiles industries grew in the high-immigration cities, but they declined 30 percent in the comparison cities. This seems to fit with the specialization story: Apparel and textiles both use less-skilled labor intensively. On the other hand, apparel and textiles are not, by themselves, large enough to absorb many less-skilled workers (even



when the industries grow a lot). Other industries that are just as large (note the circle sizes) as apparel and textiles – such as machinery or agriculture – were either not growing or were declining.

Another interesting outlier is household services, for example, house cleaners or nannies. This industry is a fairly large employer of less-skilled workers, particularly immigrants, and just like apparel and textiles, it grew in the high-immigration cities but declined elsewhere. However, household services are different from apparel and textiles in an important way: They can only be performed locally, but apparel and textiles can be sold to consumers in other markets. So although household services may have absorbed a disproportionate share of less-skilled immigrants, the expansion of this sector cannot help disperse the impact of immigration to other locations.

Broader evidence supports the result illustrated in Figure 2. I also examined adjustment in a larger number of metropolitan areas (179), and the adjustment to both high-skill and low-skill immigrants. In a typical metropolitan area I found that specialization could have absorbed no more than 10 percent of changes in the local skill mix that immigration generated.

A second investigation confirmed these results. This study examined how Miami adapted to a sudden influx of mostly unskilled Cuban refugees during the Mariel boatlift of 1980. Miami's experience after the boatlift is an important case study because the timing of these immigrants' arrival had nothing to do with labor market conditions in Miami. The event led to a large and unexpected increase in the proportion of unskilled workers in the Miami labor market. A study by David Card demonstrated that the Miami labor market adapted quickly to the event. The relative wages of Miami's

existing less-skilled workers did not fall as a result of the boatlift. (See *Does Immigration Harm the Labor Market Outcomes of Native-Born Workers?*)

Did Miami specialize? Again, the evidence suggests the answer is no. Though there were many changes in Miami's manufacturing mix after the boatlift occurred, the changes look quite similar to those in comparable cities.

All in all, it appears that specialization is not a big part of how local labor markets in the U.S. adapt to immigration. But a puzzle remains – if not through specialization, or native flight, how else might local markets be adapting?

ADAPTING TECHNOLOGY TO THE SKILL MIX

The theories considered thus far have been largely unhelpful in explaining how local labor markets in the U.S. adjust to influxes of immigrants. One explanation that shows some promise is that localities change their production methods or “technology” to accommodate employment of immigrants.

Usually, several technologies can be used to produce the same good. Cars, for example, can be produced using automated assembly lines with robots or a more traditional assembly line with workers trained in particular tasks. The latter technology requires more manual labor, and the former requires skilled workers to design and operate the automated process.

There is some evidence that firms adjust to immigration by switching to a technology that requires more unskilled labor. For example, in the high-immigration cities examined in Figure 2, the ratio of unskilled to skilled workers rose 10 percent over the 1980s.¹⁸ A wide variety of industries in these cities responded by raising the unskilled/skilled ratio of

their own workers nearly 10 percent. This suggests industries in the high-immigration cities made use of a technology that could make productive use of more unskilled labor: Unskilled relative wages hardly fell as a result of the change.

Computer technology may help localities adjust to changes in worker mix. Research by economists at MIT has shown that skilled workers use computers to perform repetitive tasks that used to be carried out by less-skilled co-workers before the adoption of computers.¹⁹ My own research shows that during the 1980s, computers were added more slowly in workplaces located in areas where the availability of unskilled labor remained relatively high. For example, the Mariel boatlift seems to have slowed the adoption of computers by skilled workers in Miami workplaces. Miami employers apparently chose to hire workers from the expanded local pool of less-skilled labor and invest less in computers. This could be one reason that wages of less-skilled workers did not fall in Miami after the boatlift. The importance of this should not be overstated; computers are but one of many technologies firms use.²⁰ However, the idea that flexible technology choice helps U.S. labor markets adapt to immigration seems a promising avenue for further investigation.

¹⁸ During this same period, rising levels of schooling among younger generations of workers caused the ratio of unskilled to skilled workers to fall 40 percent in other parts of the U.S. Thus, by the end of the decade, the cities in Figure 2 had a vastly different mix of workers than other U.S. cities.


¹⁹ See the article by David Autor, Frank Levy, and Richard Murnane.

²⁰ Popular usage notwithstanding, economists use “technology” to mean more than modern machinery. Technology also includes such things as how the workplace is organized and which types of workers are assigned particular tasks.

CONCLUSION

U.S. labor markets are currently absorbing immigrants at a rate unprecedented in recent history. Despite the heavy concentration of immigrants in certain labor markets, whatever harm immigrant competition does to

the wages and employment rates of native-born workers in those markets appears to be small. There is also little evidence that immigration's impact has been dispersed across the U.S. through either natives moving out of high-immigration areas or indirect downward

pressure on wages transmitted through the price of goods coming from high-immigration areas. How local labor markets adjust to immigration is not yet clear, but preliminary research suggests that the choice of technology may have an important role. 

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Moving Up: Trends in Homeownership and Mortgage Indebtedness

BY WENLI LI

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ince the mid-1980s, important developments have taken place in the housing finance system. In the 1990s, the U.S. economy experienced the longest expansion in its history, marked by substantial growth in household income and wealth. In addition, Congress passed the Tax Reform Act of 1986 and the Taxpayer Relief Act of 1997, two laws favorable to homeowners. Therefore, it's not surprising that homeownership rates and the mortgage indebtedness of American families have also changed significantly. In this article, Wenli Li uses the University of Michigan's Panel Study of Income Dynamics to examine the effects of these changes and how they vary across households.

The U.S. residential housing market has gone through important changes since the mid-1980s. Most noticeably, significant developments have taken place in the housing finance system. Continuous improvements in information technology have improved lenders' ability to assess risk, tailor products to different population segments, and develop new products. As a result, down payment requirements and transaction costs — e.g.,

the time, effort, legal costs, and brokerage costs — associated with mortgage applications have come down substantially, making it easier for families to qualify for a mortgage or to refinance their existing mortgages.

At the same time, the U.S. economy experienced the longest expansion in its history, marked by substantial growth in household income and wealth in the 1990s. Monetary policy was accommodative from 1990 to 1994, and mortgage interest rates fell to consecutive historical lows between 1990 and 1999.

Finally, on the regulatory front, Congress passed two laws favorable to homeowners: the Tax Reform Act of 1986 and the Taxpayer Relief Act of 1997.

Given these developments, it is not surprising that homeownership rates and the mortgage indebtedness of American families have changed in significant ways. We will see how significant the changes are by using the Panel Study of Income Dynamics (PSID), a longitudinal survey from the University of Michigan that has followed a nationally representative random sample of families and their extensions since 1968.¹ First, though, let us look at why and how households make decisions about housing and mortgages.

WHAT IS UNIQUE ABOUT OWNER-OCCUPIED HOUSING?

For most homeowners, their house is the single most important consumption good² and, at the same time, the dominant asset in their portfolios. For instance, the 2001 Survey of Consumer Finances shows that about two-thirds of U.S. households own their primary residence. Home value accounts for 55 percent of total assets for an average homeowner and more than 80 percent for over half of homeowners.

Similar to other durable consumption goods, such as cars or televisions, houses have a minimum size. For

¹ The PSID has been used widely in analyzing, among other things, household wealth dynamics, occupational choice, and labor supply decisions. For a complete reference, see the PSID web site: <http://psidonline.isr.umich.edu/Publications/Bibliography/Biblio.html>.

² Housing belongs to the category of durable consumption goods defined as those that may be used repeatedly or continuously over a period of more than a year, assuming a normal or average rate of physical usage.



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most people, their house will be the most expensive purchase of their lives. Even the least expensive house typically requires a sizable down payment. Housing adjustment — that is, buying or selling a house — is also much more costly than that of other durable goods, with sales commissions often amounting to 6 percent of the house value.

Despite the sizable down payment and sales commissions, compared with other financial assets like stocks or bonds, housing investment is often highly leveraged and relatively illiquid. Many home buyers, especially first-time buyers, borrow over 80 percent of the house value. In addition, households borrow over a much longer time horizon for house purchases than for other consumer durables, with mortgages often lasting as long as 30 years. Average tenure in a house — five to seven years — is small compared with the remaining life of the house; thus, like stocks, but unlike short-term bonds or deposits, the value of a home matters even when the mortgage has been paid off. All of these factors suggest that when a household purchases a home the investment it has made is not as risk-free as it may think.

HOW DO HOUSEHOLDS MAKE HOUSING AND MORTGAGE DECISIONS?

Like the value of any useful asset, a house's value fluctuates over time. Indeed, the record shows that although house prices are not as volatile as stock prices, they are perhaps more volatile than most people have realized. For instance, real house prices — house prices adjusted for the rate of inflation — dropped more than 2 percent in 1990, then rose more than 4 percent in 2001.³ The fluctuation is much big-

³ These numbers are calculated using the house price index constructed by the Office of Federal Housing Enterprise Oversight (OFHEO).

ger if we consider regional changes in house prices. In San Jose, California, between 1990 and 1995 house prices tumbled 29 percent. Between 1996 and 2001, however, house prices skyrocketed 84 percent, largely boosted by the stock market riches of the high-tech and dot-com industries. Then from 2001 to 2002, during the Internet bust and technology slump, house prices in San Jose dropped almost 2 percent in one year.

A potential homeowner weighs the economic benefits and costs when deciding whether to buy a house and whether and how much to borrow to finance the purchase.

The risk borne by homeowners is magnified, since house prices and salaries and benefits, the major source of income for most households, are positively correlated. This means that changes in house prices and changes in household income in a given area often move in the same direction, that is, one rises as the other rises or falls as the other falls.⁴

To see why this is true, remember that the purchase of a house requires a large down payment and a commitment to regular mortgage payments for a lengthy period. Thus, fluctuations in income can have a big impact on both the demand for and the supply of housing. For example, imagine a region that has experienced mass layoffs due to the closing of a local plant. As a result, many homeowners may put their houses on the market because of financial distress caused by lost income or because they are moving their families to regions with better employment prospects. At the same time,

⁴ See, for example, the article by Joao Cocco.

those households that had planned to purchase homes put their plans on hold either because they also got laid off or because they became pessimistic about their future earnings potential. The increased supply of and reduced demand for housing will obviously put downward pressure on local house prices and cause them to decline.

The volatility in house prices means that although houses provide comfort and shelter, homeownership

brings with it substantial financial risks. These financial risks are worse in bad times when both house prices and labor income decline, and they will be felt most painfully by homeowners who have borrowed heavily to buy their houses.

A potential homeowner weighs the economic benefits and costs when deciding whether to buy a house and whether and how much to borrow to finance the purchase. Consider two households living in the same area. One is a young commercial artist in his early to mid-twenties, and the other is headed by a computer programmer and a physician both in their early forties. As is typical for his age group, the young artist is not married and has little wealth. Though his income potential may be higher than his current income, it is also more uncertain. In contrast, the middle-aged couple has children, stable jobs, and relatively more savings.

In this case, the young household is more likely to rent and the middle-aged one is more likely to own a house. In the event that both households

become homeowners, the young artist is likely to borrow more relative to his house value and his current income. The reason is threefold. First, since the young artist's income is likely to rise over his lifetime, he will buy a house that reflects future expected income. The alternative — purchasing a series of larger houses as his income increases — is too expensive because of the transaction costs of buying and selling. The middle-aged household expects that its income is at its peak; thus, its house primarily reflects current income.

Second, lenders typically require down payments to reduce the risk of borrowers' defaulting on their mortgage loans. In fact, the agencies that dominate the secondary market for mortgages, Fannie Mae and Freddie Mac, follow the traditional practice and require mortgage insurance before they purchase any loan on a property whose mortgage exceeds 80 percent of its value. The limited net worth of the young artist makes it less likely that he can meet this down payment requirement. If he does meet the requirement, he will likely have to borrow more of the rest of the money for the purchase.

Third, the young artist's income is likely to fluctuate more than the middle-aged household's, and it may be necessary for him to access his wealth to cover expenses when income is low. Having a large amount of equity relative to his net worth tied up in a house is risky because of the transaction costs in accessing home equity through either refinancing the mortgage or selling the house. Although taking out a home equity loan is relatively cheap compared with selling, home equity loans that carry an attractive rate often require payment over a much shorter time frame — say, two to five years — and the rate typically floats. Also, a homeowner with an outstanding home equity loan will find it

more difficult to refinance or sell. For example, if the household refinances the first mortgage before the home equity loan is paid off, the new lender often requires the consent of the home equity lender. So, if he has wealth over and above the required down payment, the artist will hold more of it in liquid form than in home equity and borrow more relative to his house value and his income.

As we can see, the decisions to buy a house and to take on mortgages are complex. Family demographics, lifetime expected income, current wealth, and house prices all play important roles.

RECENT TRENDS IN HOMEOWNERSHIP RATES AND MORTGAGE INDEBTEDNESS OF AMERICAN FAMILIES

Empirical studies have found that age and income are two of the most important factors in house-purchase and mortgage-finance decisions.⁵ Using PSID data from 1984 to 2001, I have charted average homeownership rates and mortgage indebtedness of all homeowners (Figures 1 and 2) and by age and by income (Figures 3 and 4).⁶ The age of the household is that of the head, and household income includes labor earnings, unemployment insurance, and welfare transfers. Transfers include unemployment and Social Security income. The degree of homeowners' mortgage indebtedness is captured by two different measures: mortgage loan-to-value (LTV) ratios

⁵ Joseph Gyourko (2001) provides an excellent overview of the factors that affect housing decisions.

⁶ Some readers may worry whether PSID data are representative. A preliminary comparison with census data shows that both data sets tell much the same story.

and debt-service ratios (DSR). The LTV ratio is defined as the ratio of mortgage principal outstanding to the current house value. The DSR is defined as the ratio of mortgage payment — principal and interest, plus property tax — to family income.

Mortgage LTV ratios and DSRs are important because they give an indication of the potential risks lenders face should the price of houses fall or should the borrowers/homeowners suffer a decline in income. Accordingly, lenders use mortgage LTV ratios and DSRs to estimate the borrower's default risk and to decide whether to fund the mortgage and what rate to charge. These ratios also affect the underwriting standards of the major purchasers of mortgages. For instance, as mentioned earlier, Fannie Mae and Freddie Mac require mortgage insurance before they purchase any loan on a property with an LTV ratio greater than 80 percent.⁷

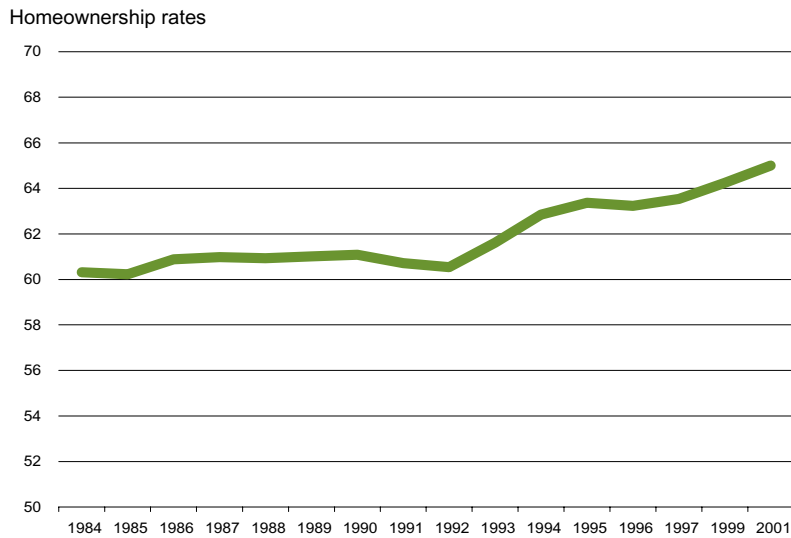
Empirical Observations. As we can see from the figures, homeownership rates were essentially flat at around 60 percent from 1984 to the early 1990s, but subsequently rose sharply. By 2001, more than 65 percent of households owned their homes.

Mortgage indebtedness for homeowners increased steadily between 1984 and 2001, according to mortgage LTV ratios. While the average mortgage LTV was 26 percent in 1984, by 2001, it had increased to more than 35 percent. The contrast is more striking when we look at changes in median LTV, which increased from 15 percent in 1984 to over 35 percent in 2001. The median DSR paints a similar

⁷ High LTV ratios are associated with greater risk of the household's defaulting provided one is very careful in controlling for borrowers' creditworthiness, that is, holding fixed other factors that affect household risk of default, for example, age or income.

FIGURE 1

Recent Trends in Homeownership Rates*

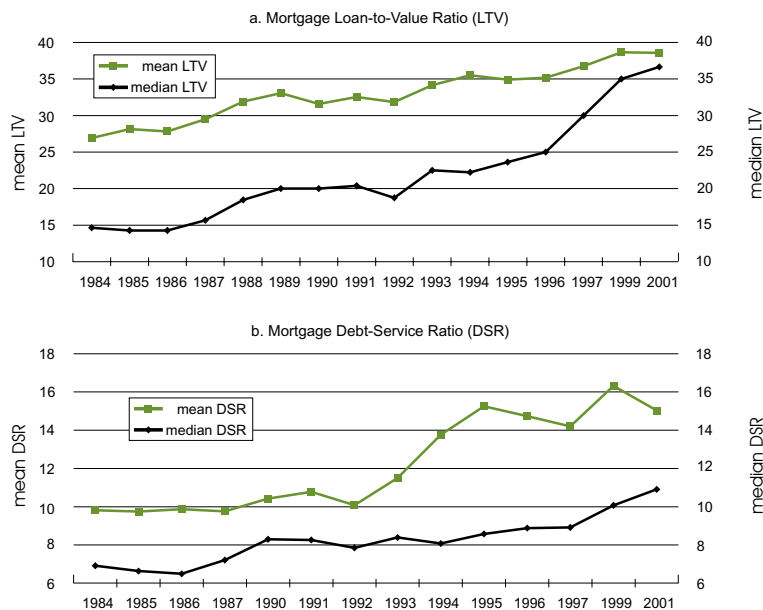


*Homeownership rates are measured as percent of households that own their primary residences.

Note: PSID data were collected annually through 1997, then bi-annually after that.

FIGURE 2

Recent Trends in Mortgage Indebtedness of Homeowners*



*Mortgage LTV = Principal Outstanding/Current House Value
 Mortgage DSR = Mortgage Payment/Family Income. Mortgage payment data are not available for 1988 and 1989.

Note: PSID data were collected annually through 1997, then bi-annually after that.

picture. According to the mean DSR, however, homeowners' mortgage indebtedness was flat from 1984 to 1992, then increased appreciably after 1992.

Middle-aged households — those whose heads of household are between 35 and 54 years of age — are generally viewed as being at the peak of their earnings profile and family size. As a result, middle-aged households are more likely to own homes than households in other age groups.⁸ Surprisingly, the middle-aged group experienced a slight decline in homeownership rates, while households in the other age groups all had either modest or substantial gains.⁹ In particular, homeownership rates for households between ages 35 and 44 dropped from 71 percent in 1984 to about 63 percent in 2001 and homeownership rates for households between ages 45 and 54 dropped from 77 percent to 75 percent.

The other thing that jumps out from these figures is that low-income households have experienced a disproportionately larger increase in both homeownership rates and mortgage indebtedness. Specifically, between 1984 and 2001, when average homeownership rates increased 4.6 percentage points, households in the 0 to 20th percentile of income experienced an increase of almost 5 percentage points, and households in the 20th to 39th percentile experienced an increase of 8.4 percentage points. When looked at in terms of growth rates, that is, percent changes, the increases are even larger.

Furthermore, while households increased their mean mortgage LTV ratio 43 percent, on average, between

⁸This is evident in the inverted-U shape of average homeownership rates over the life-cycle.

⁹A similar result is found using the Survey of Consumer Finances.

1984 and 2001, households in the lowest 20 percentiles had the largest increase of 68 percent. One might think this is driven by the households whose heads have retired. They are typically wealthier than other low-income households and have bought a house during their economically active years. But the result remains true even after we drop from the group families with heads 65 and older.

FACTORS THAT HELP EXPLAIN THE TRENDS

As I stressed earlier, the decisions to own a home and the amount to borrow to finance the purchase are governed by a number of factors, including household income, the presence of children, and the cost in obtaining and financing mortgages. Each of these factors has changed over the past decade in ways that could help explain the generally increased rate of homeownership and the increased mortgage leverage for homeowners. These factors can be grouped into three broad categories: macroeconomic conditions, the housing finance system, and the regulatory environment.

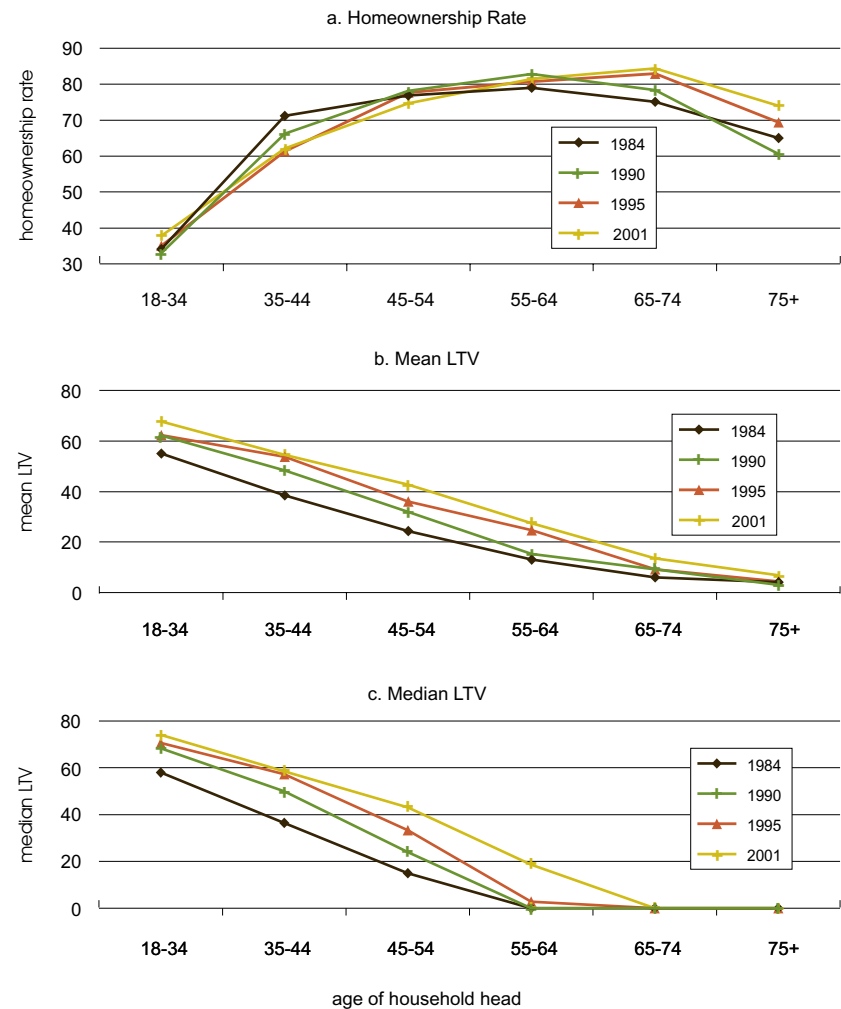
Macroeconomic Conditions.

The most important factor is almost certainly the favorable economic climate of the 1990s. Between 1991 and 2001, the U.S. economy had the longest expansion in postwar history. The huge increase in household income, the general decline in the unemployment rate, and persistently low mortgage rates not only made homes more affordable but also led to more optimism among households about their future income streams, making them more likely to buy big items such as houses.

Inflation-adjusted average household income rose 37 percent between 1984 and 2001, from \$27,552 (in 1984 dollars) to \$37,705, for households in our sample, contributing to the run-

FIGURE 3

Homeownership Rates and Mortgage Indebtedness by Household Age*



*Household age is the age of the head of the household

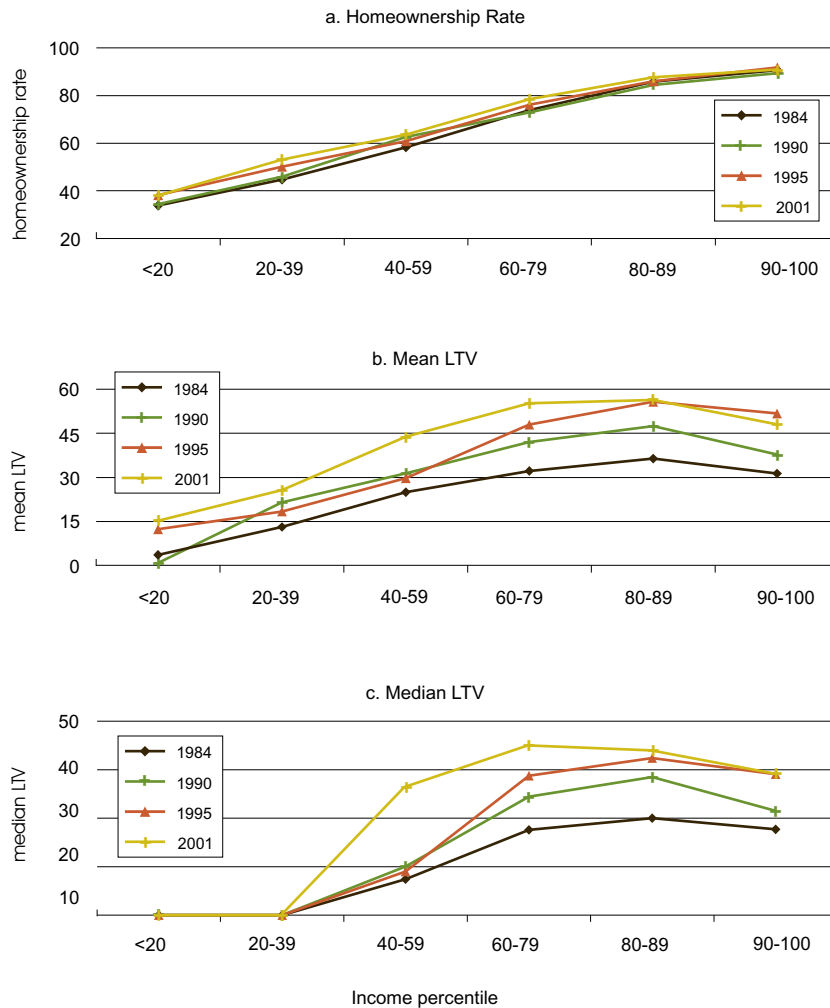
up in overall homeownership rates. Income changes, however, are quite uneven across age groups. In particular, although real household income went up for all age groups, the middle-aged households, especially those between ages 35 and 44, had the smallest growth in family income. This appears to be an important factor leading to the reduction in homeownership rates of this group of households.

The rise in income occurred against the backdrop of rising employment. The national unemployment rate trended down over this period, from a high of almost 7 percent to around 5 percent. This should boost the number of home buyers, especially low-income households, who cannot qualify for mortgages without jobs.

Rates on 30-year fixed mortgages, as reported by Freddie Mac, remained

FIGURE 4

Homeownership Rates and Mortgage Indebtedness by Income Percentile*



*Percentile is a value on a scale of 100 that indicates the percent of a distribution that is equal to or below it. For example, in 2001, the average income of a household in the 20th to 39th percentile was \$27,931 in 2001 current dollars, or \$16,221 inflation adjusted.

below 8 percent for most of the period between 1996 and 2001. The low mortgage rates reduce the monthly payment for a given mortgage and, therefore, make houses more affordable. This should help drive up the average homeownership rates for all age and income groups. The other effect of low mortgage rates is that households may choose to borrow more, relative to the house value, without increasing

their monthly payments. This would obviously lead to a higher mortgage LTV ratio among homeowners.

Innovations in Mortgage Markets. In the credit markets, technological developments have automated many stages of the lending process. For example, credit scoring is now commonly used by many lenders, thus reducing the costs of evaluating borrowers and increasing competi-

tion in mortgage markets. As a result, mortgages have become cheaper and easier to obtain.

The required down payment for home purchases is now lower than before the 1990s. Nowadays, homeowners need not have a 20 percent down payment to qualify for a mortgage, and in some instances, lenders may not ask for any down payment at all.¹⁰ In addition, both the financial and non-financial transaction costs associated with obtaining a mortgage have come down. We've seen a continued decline in average points and fees on conventional loans closed — from 2.5 percent of the average loan amount in 1983 to around 1 percent at the end of 1995 and 0.5 percent in 2004.¹¹ Lower down payments and the decline in fees and charges associated with mortgages gave rise to an increasing volume of both mortgage-purchase and mortgage-refinance applications, especially in the presence of declining mortgage rates.¹² The development of home equity lending also made housing a more liquid asset. From 1990 to 2001, home equity loans as a share of total mortgages increased from 10 percent to 14 percent according to flow of funds data from

¹⁰ Of course, the borrowers may have to pay a higher rate or purchase private mortgage insurance. According to Bruskin, Sanders, and Sykes' 2001 article, by 1994, lenders had started programs that allowed qualified households to borrow more than the value of a home, effectively creating a negative down payment that could be applied to closing costs. These innovations enabled some previously ineligible households to purchase a house and provided many others with increased buying power given their wealth.

¹¹ These statistics come from a study by Paul Bennett, Richard Peach, and Stavros Peristiani, and publications from the Federal Housing Finance Board.

¹² For example, when the 30-year fixed mortgage interest rate dropped from 8.57 percent to 5.10 percent between May 2000 and January 2003, the mortgage refinancing index constructed by the Mortgage Bankers Association surged from 319.3 to 8753.3, a 27-fold increase.

the Board of Governors. Together, these developments increased households' access to mortgage credit and thus increased homeownership among all families, particularly low-income families.

Low-income households also got an extra push from the development of subprime lending (nonprime or credit rated below "A"), designed for those unable to meet the underwriting criteria of Fannie Mae or Freddie Mac. According to an article by Neal Walters and Sharon Hermanson, the subprime mortgage lending industry has grown significantly in recent years, expanding from a \$35 billion industry in 1994 to a \$140 billion industry in 2000. Additionally, subprime mortgages currently represent 13 percent of total mortgage originations, an increase from 4 percent in 1994. Consequently, those households with not-so-perfect credit records are more likely to own and to borrow more relative to their house value and to their income now than in earlier years.

Changes in Tax Policies. Before the Tax Relief Act of 1986 (TRA-86), households could deduct interest paid on all types of household debt from their pre-tax income. In 1986, Congress changed the law to phase out the deductibility of consumer interest (interest paid on consumer loans not secured by a residence) over a five-year period while leaving the deductibility of mortgage interest intact.

The passage of TRA-86 encouraged mortgage borrowing as households reshuffled their portfolios from other consumer debt into second mortgages and home-equity debt.¹³ As a result, mortgage LTV ratios took off immediately after 1986. The effect of TRA-86 on homeownership

¹³ See the article by James Poterba and the one by Dean Maki.

rates seemed muted. One reason is that TRA-86 also reduced marginal tax rates, especially for high-income households. As a result, the value of tax-exempt imputed income for high-income homeowners was also reduced, offsetting some of the benefits of homeownership associated with the mortgage-interest deduction. Another, perhaps more plausible, reason is that a significant number of households may have been unable to put together the down payment required to buy a house. Put simply, those households that do not qualify for a mortgage will not be helped by the passage of TRA-86.

The Taxpayer Relief Act of 1997 (TRA-97) relaxed the previous requirements for home sellers by exempting more of the profits from the sale of a house from capital gains taxes. The new law allows people to deduct a larger amount of capital gains from the sale of their houses even if they have not stayed in the house for two years as long as the move is due to a job change or a change in family structure (e.g., a death in the family). The passage of TRA-97 obviously provided additional benefits for homeownership, especially for young households. Because young households are more likely to move as part of a change in jobs, the risk of buying and being forced to move within two years is higher for them.

Stronger Enforcement of Fair Lending Laws. Although the federal government has put in place a number of fair lending laws, both policymakers and economic researchers have expressed broad concerns about discrimination in credit markets, especially the mortgage market. Many studies have documented that minority loan applicants have significantly higher rejection rates than majority applicants with the same observable characteristics.¹⁴ Although it is debatable whether the higher rejection rates necessarily

indicate discrimination, these studies raised concerns about the enforcement of these laws.¹⁵

In 1990, two prominent fair-lending laws — the Community Reinvestment Act and the Home Mortgage Disclosure Act — were refocused to better ensure compliance with the law. The Community Reinvestment Act is intended to encourage depository institutions, such as banks, to help meet the credit needs of the communities in which they operate, including low- and moderate-income neighborhoods. The Home Mortgage Disclosure Act provides data that are used to determine whether financial institutions are serving the housing needs of their communities and to identify possible discriminatory lending patterns. The refocusing of these two laws benefited minority and low-income households and helped increase their homeownership rates and mortgage borrowing.¹⁶

HOUSING AND THE RECENT ECONOMIC DOWNTURN

Housing wealth fluctuates over time, and more and more American families own homes and more and more of them are holding large mortgages relative to their house value and income. Under such circumstances, we would expect such fluctuations to have

¹⁴ See, for example, recent works by Alicia Munnell, Geoffrey Tootell, Lynn Browne, and James McEneaney, and by David Blanchflower, Phillip Levine, and David Zimmerman.

¹⁵ See the article by John Walter for a review of the enforcement of some of the fair lending laws.

¹⁶ Raphael Bostic and Breck Robinson argue that the effectiveness of CRA agreements in increasing lending activity is ultimately determined by the persistence and sophistication of community groups in monitoring compliance with CRA agreements. For discussions on other related housing policies, see the *Business Review* article by Satyajit Chatterjee and the one by N. Edward Coulson and the papers cited in those articles.

a large impact on consumption. For example, policymakers and academics widely believe that the steady increase in house value was the driving force behind increases in consumption expenditures during the economic softening and downturn between 1999 and 2001, when output growth slowed and the stock market plummeted.¹⁷

Using aggregate data on consumption and wealth, researchers have found that households' willingness to increase consumption when their wealth permanently increases is about the same whether the wealth increase is the result of owning stocks or housing: between 4 and 10 cents for each dollar of increased wealth.¹⁸ Given the nearly \$5000 billion drop in stock market wealth held by households and nonprofit organizations and the nearly \$2000 billion increase in hous-

¹⁷ In their recent study, Erik Hurst and Frank Stafford found that as mortgage rates plummeted between 1991 and 1994, cash-out refinancing produced an estimated expenditure stimulus of at least \$28 billion. Speaking at the 2003 Philadelphia Fed Policy Forum, Frank Stafford also pointed out that people who paid premium rates to refinance in the late 1990s often subsequently got into financial distress and pulled back spending. As a result, policymakers cannot expect to use the mortgage refinancing channel recurrently over short periods. (For a more complete summary of Stafford's remarks at the Policy Forum, see Loretta Mester's article in the *Business Review*, Third Quarter 2004.)

¹⁸ See the articles by Morris Davis and Michael Palumbo; Wenli Li; and Sydney Ludvigson and Charles Steindel. In a separate paper, however, Martin Lettau and Sydney Ludvigson argued that households increase spending by only 60 cents for a \$100 increase in wealth, since individuals view most of the change in wealth as transitory. See the summary by Loretta Mester.

ing wealth as reported in the Federal Reserve Board's flow of funds,¹⁹ we can conclude that increases in housing wealth offset close to half of the hit to consumption from declining stock market wealth between 1999 and 2001.²⁰ That is, increased housing wealth raised consumption by approximately \$100 billion during this period.²¹

Since one important way for households to transform higher housing wealth into consumption is to extract home equity through selling the house, refinancing the mortgage, or taking out a home equity loan, it is not surprising that we observed an increase in mortgage LTV ratios from 1999 to 2001. Having said this, we should note that the calculations relating changes in consumption to changes in wealth refer to long-run effects. In the short run, one would imagine consumption may adjust more sluggishly to changes in wealth, especially to those in housing wealth. The numbers we present almost surely overestimate the positive effect of housing wealth on consumption in the short run.

¹⁹ The numbers are inflation adjusted using chained core PCE, with 2000 as the base year.


²⁰ Here I am treating the house price movement as independent of stock price changes. There are obvious reasons to believe that part of the housing boom is due to households' redirecting their investment from the stock market to housing.

²¹ This assumes a marginal propensity to consume out of wealth of 0.05, that is, a \$5 increase in consumption for each \$100 increase in wealth.

Before concluding, it is worth pointing out that the investigations here were conducted on primary residences only. Anecdotal evidence suggests that important changes had also occurred in ownership of second homes, such as vacation homes, during the same period.

SUMMARY

During the last decade or so, more American families have become homeowners, homeowners have become more leveraged in financing their purchases, and the changes are uneven across households of different ages and incomes. Three primary factors help explain this observed trend: improvement in housing finance systems, an accommodating economic climate, and regulatory changes. Of course, more formal analyses are needed to quantify exactly the contribution of changes in each factor to the observed trends and to model the exact channel through which housing wealth has affected consumption.

The importance of these trends is underscored by looking at the role of housing in the recent economic slowdown and recovery. The stock market declines in 2000-2002 might have suggested a large decline in consumer spending. But instead of falling as consumer spending usually does during recessions, it continued to rise (albeit at a slower rate). This no doubt reflected the effects of stimulative monetary and fiscal policies, but as we discussed here, housing wealth may have also played a role by providing a cushion for many homeowners. 

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