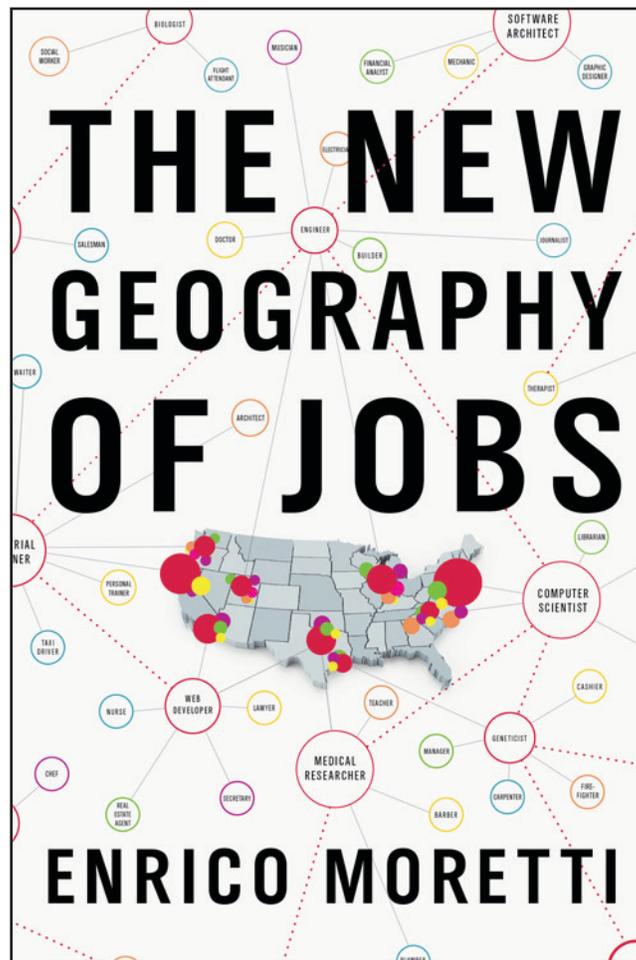


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INTRODUCTION

Menlo Park is a lively community in the heart of Silicon Valley, just minutes from Stanford University's manicured campus and many of the Valley's most dynamic high-tech companies. Surrounded by some of the wealthiest zip codes in California, its streets are lined with an eclectic mix of midcentury ranch houses side by side with newly built mini-mansions and low-rise apartment buildings. In 1969, David Breedlove was a young engineer with a beautiful wife and a house in Menlo Park. They were expecting their first child. Breedlove liked his job and had even turned down an offer from Hewlett-Packard, the iconic high-tech giant in the Valley. Nevertheless, he was considering leaving Menlo Park to move to a medium-sized town called Visalia. About a three-hour drive from Menlo Park, Visalia sits on a flat, dry plain in the heart of the agricultural San Joaquin Valley. Its residential neighborhoods have the typical feel of many Southern California communities, with wide streets lined with one-story houses, lawns with shrubs and palm trees, and the occasional backyard pool. It's hot in the summer, with a typical maximum temperature in July of ninety-four degrees, and cold in the winter.

Breedlove liked the idea of moving to a more rural community with less pollution, a shorter commute, and safer schools. Menlo Park, like many urban areas at the time, did not seem to be heading in the right direction. In the end, Breedlove quit his job, sold the Silicon Valley house, packed, and moved the family to Visalia. He was not the only one. Many well-educated professionals at the time were leaving cities and moving to smaller communities because they thought those communities were better places to raise families. But things did not turn out exactly as they expected.

In 1969, both Menlo Park and Visalia had a mix of residents with a wide range of income levels. Visalia was predominantly a farming community with a large population of laborers but also a sizable number of professional, middle-class families. Menlo Park had a largely middle-class population but also a significant number of working-class and low-income households. The two cities were not identical—the typical resident of Menlo Park was somewhat better educated than the typical resident of Visalia and earned a slightly higher salary—but the differences were relatively small. In the late 1960s, the two cities had schools of comparable quality and similar crime rates, although Menlo Park had a slightly higher incidence of violent crime, especially aggravated assault. The natural surroundings in both places were attractive. While Menlo Park was close to the Pacific Ocean beaches, Visalia was near the Sierra Nevada range and Sequoia and Kings Canyon National Parks.

Today the two places could not be more different, but not in the way David Breedlove envisioned. The Silicon Valley region has grown into the most important innovation hub in the world. Jobs abound, and the average salary of its residents is the second highest in America. Its crime rate is low, its school districts are among the best in the state, and the air quality is excellent. Fully half of its residents have a college degree, and many have a PhD, making it the fifth best educated urban area in the nation. Menlo Park keeps attracting small and large high-tech employers, including most recently the new Facebook headquarters.

By contrast, Visalia has the second lowest percentage of college-educated workers in the country, almost no residents with a postgraduate degree, and one of the lowest average salaries in America. It is the only major city in the Central Valley that does not have a four-year college. Its crime rate is high, and its schools, structurally unable to cope with the vast number of non-English-speaking students, are among the worst in California. Visalia also consistently ranks among American cities with the worst pollution, especially in the summer, when the heat, traffic, and fumes from farm machines create the third highest level of ozone in the nation.

Not only are the two communities different, but they are growing more and more different every year. For the past thirty years, Silicon Valley has been a magnet for good jobs and skilled workers from all over the world. The percentage of college graduates has increased by two-thirds, the second largest gain among American metropolitan areas. By contrast, few high-paying jobs have been created in Visalia, and the percentage of local workers with a college degree has barely changed in thirty years—one of the worst performances in the country.

For someone like David Breedlove, a highly educated professional with solid career options, choosing Visalia over Menlo Park was a perfectly reasonable decision in 1969. Today it would be almost

unthinkable. Although only 200 miles separate these two cities, they might as well be on two different planets.

The divergence of Menlo Park and Visalia is not an isolated case. It reflects a broader national trend. America's new economic map shows growing differences, not just between people but between communities. A handful of cities with the "right" industries and a solid base of human capital keep attracting good employers and offering high wages, while those at the other extreme, cities with the "wrong" industries and a limited human capital base, are stuck with dead-end jobs and low average wages. This divide—I will call it the Great Divergence—has its origins in the 1980s, when American cities started to be increasingly defined by their residents' levels of education. Cities with many college-educated workers started attracting even more, and cities with a less educated workforce started losing ground. While in 1969 Visalia did have a small professional middle class, today its residents, especially those who moved there recently, are overwhelmingly unskilled. Menlo Park had many low-income families in 1969, but today most of its new residents have a college degree or a master's degree and a middle- to upper-class income. Geographically, American workers are increasingly sorting along educational lines. At the same time that American communities are desegregating racially, they are becoming more segregated in terms of schooling and earnings.

Certainly any country has communities with more or less educated residents. But today the difference among communities in the United States is bigger than it has been in a century. The divergence in educational levels is causing an equally large divergence in labor productivity and therefore salaries. Workers in cities at the top of the list make about two to three times more than identical workers in cities at the bottom, and the gap keeps growing.

Cities with a high percentage of skilled workers offer high wages not just because they have many college-educated residents and these residents earn high wages. This would be interesting but hardly surprising. But something deeper is going on. A worker's education has an effect not just on his own salary but on the entire community around him. The presence of many college-educated residents changes the local economy in profound ways, affecting both the kinds of jobs available and the productivity of every worker who lives there, including the less skilled. This results in high wages not just for skilled workers but for most workers.

I consider the Great Divergence to be one of the most important developments in the United States over the past thirty years. As we will discover, the growing economic divide between American communities is not an accident but the inevitable result of deep-seated economic forces. More than traditional industries, the knowledge economy has an inherent tendency toward geographical agglomeration. In this context, initial advantages matter, and the future depends heavily on the past. The success of a city fosters more success, as communities that can attract skilled workers and good jobs tend to attract even more. Communities that fail to attract skilled workers lose further ground.

The growing divergence of American communities is important not just in itself but because of what it means for American society. While the divide is first and foremost economic, it is now beginning to affect cultural identity, health, family stability, and even politics. The sorting of highly educated Ameri-

cans into some communities and less educated American into others tends to magnify and exacerbate all other socioeconomic differences. For example, there are vast differences in life expectancy among inhabitants of American cities, and these differences have been expanding for the past three decades. The divorce rates, crime rates, and political clout of different communities have also been diverging. These trends are reshaping the very fabric of our society.

The United States is not in particularly high spirits these days. Fear of economic decline is widespread, and insecurity about America's standing in the world and its economic future is growing. Talk of the "death of the American dream" is everywhere, from well-articulated op-ed pieces to crude talk radio shows, from casual barbershop conversations to highbrow academic symposia. In a nation sharply divided along political lines, concern about the economy is shared almost equally by those on the left and on the right.

On the surface it seems we have good reason to be worried. Middle-class salaries are declining. Good jobs are scarce. Take the typical forty-year-old male worker with a high school education: today his hourly wage is 8 percent lower than his father's was in 1980, adjusted for inflation. This means that for the first time in recent American history, the average worker has not experienced an improvement in standard of living compared to the previous generation. In fact he is worse off by almost every measure. On top of this, income inequality is widening. Uncertainty about the future is now endemic.

But the economic picture is more complex, more interesting, and more surprising than the current debate suggests. America's labor market is undergoing a momentous shift. While some sectors and occupations are dying, others are growing stronger, and still others, just born, promise to alter the landscape dramatically. Most of all, the geography of jobs is changing in profound and irreversible ways. While these trends are national, even global, in scope, their effects are profoundly different in different cities and regions of the country. For example, the effects of globalization, technological progress, and immigration on American workers are not uniform across the United States. They favor the residents of some cities and hurt the residents of others. As old manufacturing capitals disappear, new innovation hubs are rising and are poised to become the new engines of prosperity. An unprecedented redistribution of jobs, population, and wealth is under way in America, and it's likely to accelerate in the decades to come. Some of the changes in the economic map reflect long-run forces that are outside our control. Others can be shaped and managed. But none of them are random, chaotic, or unpredictable. In the end, they all reflect clear and rather basic economic principles. Unfortunately, they tend to be obscured by the flood of data on the fluctuations of the stock market or the latest employment numbers. The focus on short-term events often results in information that is incomplete, irrelevant, or both. What happened today, this week, or even this month is not very illuminating, because the fundamentals of an economy evolve at a much slower pace.

But if we take a step back and look at the big picture, the forces that have been driving these changes reveal themselves very clearly. They are far more fascinating and much more important than the daily movements of the Dow Jones. This book examines the long-term trends that really matter to our lives—the vast changes that have taken place in the American labor market over the past three decades and the

economic forces underlying these changes. But it also looks forward, seeking to provide insight into the trends that will shape our economy over the next three decades.

Economists like to distinguish cyclical change, the ups and downs of the economy driven by the endless cycle of recessions and expansions, from secular change, the long-run developments that are driven by deep-seated but slower-moving economic dynamics. Most of the current public debate on the economy—in the media, in Congress, in the White House—focuses on the former. The time horizon in this debate is six months or a year at most: How do we end the recession? What should be in this year's budget? How will unemployment affect the next election? In this book, the focus is almost entirely on the forces that drive long-run trends. Understanding why these changes are taking place, where they are occurring, and how they are affecting individual Americans is crucial. Our jobs, our communities, and our economic destiny are at stake.

The changes taking place in the United States can be seen around the globe. New economic powerhouses are displacing old ones. What used to be tiny, barely visible dots on the map have turned into thriving megalopolises with thousands of new companies and millions of new jobs. Nowhere are these changes more obvious than in the Chinese city of Shenzhen. If you have not heard of it, you will. It is one of the fastest-growing cities in the world. In just three decades it has gone from being a small fishing village to being a huge metropolis with more than 10 million residents. In the United States, a fast-growing city like Las Vegas or Phoenix may triple or quadruple in size over a thirty-year period. Shenzhen's population has grown by more than 300 times in the same period. In the process, Shenzhen has become one of the manufacturing capitals of the world.

Shenzhen's rise is truly remarkable because it parallels almost perfectly the decline of U.S. manufacturing centers. Thirty years ago Shenzhen was an unremarkable small town that no one outside of southern Guangdong Province had even heard of. Its fate—as well as the fate of millions of American manufacturing workers—was sealed in 1979, when the Chinese leadership singled it out to be the first of China's "Special Economic Zones." These zones quickly became a magnet for foreign investment. In turn, that flow of investment led to thousands of new factories. These factories are where many American manufacturing jobs have gone.

As Detroit and Cleveland have declined, Shenzhen has grown. Massive production facilities of all kinds carpet the region. Every year the skyline adds new high-rise offices and apartments, and its workforce swells as more and more farmers leave rural areas to look for better-paying jobs in its cavernous factories. The Chinese call it the city with "one high-rise a day and one boulevard every three days." As you walk along its wide streets, you feel the city's energy and optimism. Shenzhen has been China's top exporter for the past two decades and has built one of the world's busiest ports, a sprawling facility dotted with huge cranes, enormous trucks, and containers of all colors. Twenty-four hours a day, seven days a week, 365 days a year, these containers are loaded onto enormous cargo ships bound for the West Coast of the United States. Twenty-five million of these containers leave the port each year, almost one per second. In less than two weeks that merchandise will be on a truck headed for a Walmart distribution center, an IKEA warehouse, or an Apple store.

Shenzhen is where the iPhone is assembled. If there is a poster child of globalization, it is the iPhone. Apple has given as much attention to designing and optimizing its supply chain as to the design of the phone itself. The process by which the iPhone is produced illustrates how the new global economy is reshaping the location of jobs and presenting new challenges for American workers.

Apple engineers in Cupertino, California, conceived and designed the iPhone. This is the only phase of the production process that takes place entirely in the United States. It involves product design, software development, product management, marketing, and other high-value functions. At this stage, labor costs are not the main consideration. Rather, the important elements are creativity and ingenuity. The iPhone's electronic parts—sophisticated, but not as innovative as its design—are made mostly in Singapore and Taiwan. Only a few components are made in the United States. The last phase of production is the most labor-intensive: workers assemble the hardware and prepare it for shipping. This part, where the key factor is labor costs, takes place on the outskirts of Shenzhen. The facility is one of the largest in the world, and its sheer size is extraordinary: with 400,000 workers, dormitories, stores, and even cinemas, it is more like a city within a city than a factory. If you buy an iPhone online, it is shipped directly to you from Shenzhen. Incredibly, when it reaches the American consumer, only one American worker has physically touched the final product: the UPS delivery guy.

At a superficial level, the story of the iPhone is troubling. Here you have an iconic American product that has captivated consumers everywhere, but American workers are involved only in the initial innovation phase. The rest of the process, including the making of the sophisticated electronic components, has been moved overseas. It is therefore natural to wonder what might be left to American workers in the decades to come. Is America entering a phase of irreversible decline?

Over the past half century, the United States has shifted from an economy centered on producing physical goods to one centered on innovation and knowledge. Jobs in the innovation sector have been growing disproportionately fast. The key ingredient in these jobs is human capital, which consists of people's skills and ingenuity. In other words, humans are the essential input—they are coming up with the new ideas. The same two forces that have decimated traditional manufacturing, globalization and technological progress, are now driving the rise of jobs in the innovation sector. The Great Recession has temporarily halted this growth, but the long-term trend points upward.

Globalization and technological progress have turned many physical goods into cheap commodities but have raised the economic return on human capital and innovation. For the first time in history, the factor that is scarce is not physical capital but creativity. Not surprisingly, innovators capture the largest share of the value of new products. The iPhone is made of 634 components. The value created in Shenzhen is very low, because assembly can be done anywhere in the world. Even sophisticated electronic parts, like flash memories and retina displays, create limited value, because of strong global competition. The majority of the iPhone's value comes from the original idea, its unique engineering, and its beautiful industrial design. Essentially this is why Apple receives \$321 for each iPhone—much more than any part supplier involved in physical production. This matters tremendously, not just for Apple's profit margin and for our sense of national pride, but because it means good jobs.

The innovation sector includes advanced manufacturing (such as designing iPhones or iPads), information technology, life sciences, medical devices, robotics, new materials, and nanotechnology. But innovation is not limited to high technology. Any job that generates new ideas and new products qualifies. There are entertainment innovators, environmental innovators, even financial innovators. What they all have in common is that they create things the world has never seen before. We tend to think of innovations as physical goods, but they can also be services—for example, new ways of reaching consumers or new ways of spending our free time. Today this is where the real money is. A part of the \$321 that Apple receives ends up in the pockets of Apple’s stockholders, but some of it goes to Apple’s employees in Cupertino. And because of the company’s great profitability, it has the incentive to keep innovating and to keep hiring workers. Studies show that the more innovative a company is, the better paid its employees are.

You might think that the rise of innovation is pretty exciting if you work for, say, Google or a biotech company but that it doesn’t matter all that much if you’re a teacher or a doctor or a police officer. After all, the majority of Americans will never work for a high-tech startup. Why should they care about the rise of innovation? As it turns out, however, innovation matters not only for the well-educated workers who are directly employed by high-tech firms—the scientists, engineers, and creators of new ideas—but for most American workers.

If you take a walk in one of America’s cities, most of the people you see on the street will be store clerks and hairstylists, lawyers and waiters, not innovators. About a third of Americans work either for the government or in the education and health services sectors, which include teachers, doctors, and nurses. Another quarter are in retail, leisure, and hospitality, which includes people working in stores, restaurants, movie theaters, and hotels. An additional 14 percent are employed in professional and business services, which include employees of law, architecture, and management firms. In total, two-thirds of American jobs are in the local service sector, and that number has been quietly growing for the past fifty years. Most industrialized nations have a similar percentage of local service jobs. The goods and services in this sector are locally produced and locally consumed and therefore do not face global competition. Although jobs in local services constitute the vast majority of jobs, they are the effect, not the cause, of economic growth. One reason is that productivity in local services tends not to change much over time. It takes the same amount of labor to cut your hair, wait on a table, drive a bus, or teach math as it did fifty years ago. By contrast, productivity in the innovation sector increases steadily every year, thanks to technological progress. In the long run, a society cannot experience salary growth without significant productivity growth. Fifty years ago, manufacturing was the driver of this growth, the one sector responsible for raising the wages of American workers, including local service workers. Today the innovation sector is the driver. Thus, what happens to the innovation sector determines the salary of many Americans, whether they work in innovation or not.

A second reason that the rise of innovation matters to all of us has to do with the almost magical economics of job creation. Innovative industries bring “good jobs” and high salaries to the communities where they cluster, and their impact on the local economy is much deeper than their direct effect. At-

tracting a scientist or a software engineer to a city triggers a multiplier effect, increasing employment and salaries for those who provide local services. In essence, from the point of view of a city, a high-tech job is more than a job. Indeed, my research shows that for each new high-tech job in a city, five additional jobs are ultimately created outside of the high-tech sector in that city, both in skilled occupations (lawyers, teachers, nurses) and in unskilled ones (waiters, hairdressers, carpenters). For each new software designer hired at Twitter in San Francisco, there are five new job openings for baristas, personal trainers, doctors, and taxi drivers in the community. While innovation will never be responsible for the majority of jobs in the United States, it has a disproportionate effect on the economy of American communities. Most sectors have a multiplier effect, but the innovation sector has the largest multiplier of all: about three times larger than that of manufacturing. Later we will discover why this is the case. For now, let me just point out that the multiplier effect has important and surprising implications for local development strategies. One is that the best way for a city or state to generate jobs for less skilled workers is to attract high-tech companies that hire highly skilled ones.