The New Geography of Jobs by Enrico Moretti
Executive Summary

Overview

In *The New Geography of Jobs*, Enrico Moretti underscores the importance of innovation. “As old manufacturing capitals disappear,” he writes, “new innovation hubs […] are poised to become the new engines of prosperity.” Contending that the U.S. is now a “knowledge economy,” Moretti proposes a shift in focus from physical production (and its attendant threat of outsourcing) to specialized jobs that require skilled human capital. He defines “innovation” as more than “physical goods,” noting, “[innovations] 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.” Ergo, the money is in ideas, and ideas are the crux of innovation.

Innovation rewrites the conversations around outsourcing, transforming it from an obstacle to an advantage. “While outsourcing causes job losses in most parts of traditional manufacturing,” Moretti says, “the opposite is true for the innovation sector.” The outsourcing of *assembly* jobs is likely, but that assembly supports an increase in American jobs – positions for “advertisers, designers, analysts, accountants,” and other professionals. Additionally, these jobs are shielded from outsourcing because their value is determined by the metrics of innovation – a sector that relies on creative human capital – rather

than by labor costs. The iPhone is one example of a product that creates American innovation-sector jobs while its physical production takes place overseas.

The essentiality of the innovation sector lies in its "multiplier effect." The multiplier effect "increase[es] employment and salaries for those who provide local services." Moretti finds 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)." Thus, innovation is relevant in both skilled and unskilled labor markets – a subject worthy of national consideration, rather than being limited to concentrated "brain hubs."

The interplay between innovation and geography, Moretti argues, is primarily determined by education. "Geographically, American workers are increasingly sorting along educational lines," he writes, naming the outcome "The Great Divergence." Citing the start of the Great Divergence in the 1980s, Moretti examines the three subsequent decades, claiming that the Divergence has created "three Americas": first, the "brain hubs," characterized by "a well-educated labor force and a strong innovation sector." Brain hubs continue to grow and to attract human capital. A second, economically unstable America is comprised of former manufacturing hubs – cities that are "losing jobs and residents." The third America "could go either way," Moretti says. By examining

flourishing cities and burgeoning industries, he identifies practices to employ and mistakes to avoid.

One mistake to avoid is to engage in old patterns of thinking. The wisdom of the manufacturing age doesn't always apply. Unlike traditional manufacturing, innovation hubs do not relocate to less-expensive locations. Moretti writes, "In innovation, a company's success depends on more than just the quality of its workers – it also depends on the entire ecosystem that surrounds it." He observes the instrumentality of these "ecosystems" when he describes the three forces of agglomeration: "thick labor markets (that is, places where there is a good choice of skilled workers trained in a specific field), the presence of specialized service providers, and, most important, knowledge spillovers." According to Moretti, these forces "hold the key to making struggling cities more economically successful."

In addition to his exploration of exemplary "ecosystems," Moretti points to a number of market failures that impede the process of economic growth. His primary example is education, a key factor in the strength of local ecosystems. "The more college graduates there are [in a city], the higher the salaries for high school graduates are." He presents three reasons for this corollary: "First, skilled and unskilled workers complement each other; an increase in the former raises the productivity of the latter." The second reason is that "a better-educated labor force facilitates the adoption of newer and better technologies by local

employers." Finally, "an increase in the overall level of human capital in a city generates what economists call *human capital externalities*."

The people who benefit most from this dynamic are those with less education and fewer skills: "[T]he lower the skill level, the larger the salary gains from other people's education," Moretti writes. "[W]ell-educated individuals are not fully compensated for the social benefits that their education generates." To "correct for this market failure," Moretti suggests "public subsidies for college education."

Another market failure Moretti addresses is the influence of "a new entrant" into an innovation cluster. By virtue of the new entrant's presence, "the other firms are and workers in the cluster […] are made more productive." Moretti returns to the notion of government subsidy: "government intervention could improve efficiency by subsidizing workers and firms for the benefits they generate." In both preceding examples, proximity to human capital is a key factor in ecosystems that are positioned to grow. "New ideas are rarely born in a vacuum," he writes. Even the current model of venture capitalism "has a predilection for local ventures," in part because "venture capitalists do not simply write a check and then disappear." Instead, a VC firm's role may include "active monitoring, nurturing, and mentoring of new businesses." Whether it be an individual college student or a start-up in need of funds, propinquity to a hub of successful peers is increasingly crucial.

Moretti focuses on “the forces that drive long-run trends.” Eschewing short-term solutions (though he acknowledges their appeal), he calls for changes in policy. “As a society, we are much too focused on the present at the expense of the future,” he writes. “The magic of compound growth means that even tiny differences in growth rates can have enormous consequences for our future jobs and incomes. Thus, policies that can increase growth even marginally are vastly more important than any short-term fix to the economy.” Describing the merits of “a ‘big push’ strategy” – public subsidy of education and research – Moretti’s goal is clear: to create “a cluster that in the long run becomes self-sustaining.” Admittedly, he adds, “it is hard to find an example of [a major innovation cluster] that was spawned by a big push.” He concludes, “anytime we spend public money to support private enterprises, we need to ask whether there is a sound economic rationale for that decision.”

Over the course of seven chapters, Moretti searches for potential antidotes to the problem of the “three Americas.” Solutions vary by region and industry, but there are four consistent factors across all sectors: innovation, education, location, and agglomeration. Chapter Two (Smart Labor: Microchips, Movies, and Multipliers) and Chapter Seven (The New Human Capital Century) are worthy of particular consideration. They examine the adaptability of innovative businesses and the power of a talented, high-skilled labor market.

Chapter One: American Rust

Moretti begins with a history of American manufacturing between 1946 and 1975. He credits "good manufacturing jobs" for "our transition from a low-income society to a middle-class society." Economic growth was "tied to the rising productivity of manufacturing industries such as automobiles, chemicals, and steel," so that in 1950, Detroit was "the third richest city in the United States […] the Silicon Valley of its day." Detroit was a site of "agglomeration of cutting-edge companies," just as Silicon Valley is today; like Silicon Valley, it drew talented human capital – people who wanted access to an innovative ecosystem and the benefits it provides.

American consumerism developed during this period for two reasons. First, "higher productivity enabled manufacturers to produce goods more efficiently and therefore more cheaply." Second, the country saw "substantial wage increases" within manufacturing and beyond. Manufacturing peaked in 1978; by the following year, "oil prices skyrocketed," increasing the cost of production and causing significant job loss. The losses continue: "Since 1985, the United States has lost an average of 372,000 manufacturing jobs every year." Though it once propelled many Americans into the middle-class, the manufacturing sector "is no longer the engine of prosperity for local communities." Moretti points out that job loss in manufacturing extends into other sectors: "[A]s factories close, many of the service jobs in these cities also disappear."

For members of that once-flourishing middle class, the growth has stopped. “While the standard of living for the average family more than doubled from 1946 to 1978, it has been largely stagnant ever since.” As he seeks explanations for this “reversal of fortune,” Moretti urges his readers to think beyond the contemporary cultural tendency to “place the blame on banks.” He writes, “Wall Street did not kill blue-collar America […] The problems with American manufacturing jobs are structural, and they reflect deep economic forces that have been gaining strength over the past half century: globalization and technological progress.”

Turning to the garment industry for specific examples, Moretti charts the history of Levi Strauss. The factory was founded in San Francisco in 1853, and by 1994 it still operated there, paying higher wages than its peers. In the interest of lowering costs, production moved to Asia in 2001. Garment industry jobs that remain in the U.S are “design, marketing, and sales,” but such jobs “are not growing in any appreciable way.” On the other hand, “in the innovation sector the design and engineering jobs are numerous and growing fast.”

Moretti addresses “manufacturing hipsters,” who have the look and language of manufacturing as they produce “local artisanal goods.” Trendy and expensive, these products indicate that wealth has already been generated by other means. “[T]hese jobs can’t be the *driver* of job growth in a community,” not only because there are too few of them but also because they depend on local wealth.

On the other end of the spectrum, far from local artisanal goods, stands Walmart. Moretti looks at Walmart, which relies on international trade, through the lens of comparative advantage: “if each country concentrates on the industries in which it is relatively more productive, everybody wins.” Furthermore, Moretti notes, low-income people benefit from this result of globalization more than the rich, since they are more likely to buy inexpensive imported goods. People who don’t shop at Walmart also benefit from its presence because it affects the prices set by local competitors. Moretti dismisses popular narrative about globalization – the fear that another country will “steal our jobs” – stating that “trade is not a zero-sum game.” When “goods […] become cheaper,” we become “a little richer.”

The decline of manufacturing is concentrated in consumer products. “The United States still produces many physical goods,” including “high-end nonconsumer goods, such as airplanes, industrial machines, and advanced medical devices.” Production is increasingly efficient, which means fewer people are needed, but Moretti contends that this is necessary: “an increase in the productivity of labor is the main way in which societies become more prosperous and elevate their standard of living.” He points to the shift from agriculture to manufacturing: “the same transformation is taking place again.”

One of the notable changes is the slow erasure of “middle-wage, middle-skill jobs,” since computers can often perform the “routine tasks” required of this type of work. Moretti describes this as the “hollowing out” of the labor

market. Increased productivity is essential; the question is how to adapt to the constant change.

Chapter Two: Smart Labor: Microchips, Movies, and Multipliers

Moretti profiles Dominic Glynn, a color scientist and lead engineer at Pixar Animation Studios. Glynn's work is intriguing; more importantly, Pixar is an example of an innovative company that adapted to change. "In its early years, Pixar was mostly a computer hardware company," providing "graphic design for hospitals and medical research facilities." When this turned out to be prohibitively expensive, Pixar found an innovative use for its capabilities. John Lasseter, who would later serve as Pixar's chief creative officer, "began producing computer-animated shorts […] to demonstrate the visual power of the technology." Moretti writes, "Pixar had found its true vocation. It shed the hardware side and embraced moviemaking […] This is innovation at its best, a fusion of technical creativity and artistic expression that generates something new and valuable."

Moretti attributes the company's success to "the talent and creativity" of its human capital. Citing Pixar as an exemplar, he predicts that innovation "will soon be what manufacturing used to be in the 1950s and 1960s: America's main engine of prosperity." He acknowledges the difficulty of defining innovation jobs, which "take many forms." He lists high-tech innovation – "information technology, life sciences, clean tech, new materials, robotics, and nanotechnology" – but adds that innovation jobs exist "outside of science and engineering." His comment on the importance of human capital applies to every forward-looking city and industry: "What [innovation jobs] have in common is that they make intensive use of human capital and human ingenuity."

Moretti provides specific data for certain industries. “[I]nformation technology is one of the most important sources of employment, productivity, and investment growth over the past fifty years.” Furthermore, “the Internet sector alone is responsible for about one-fifth of the growth of the American economy between 2004 and 2008.” As for software, job growth is 562 % over the past two years, which is “thirty-three times greater than the rest of the labor market.” Life science research shows 300% growth in employment.

Returning to his assertion that there’s “more than science and engineering,” Moretti looks at other industries, including “entertainment, industrial design, marketing, and even finance.” Some financial innovation is bolstered by venture capital. Moretti looks at Prosper, “a peer-to-peer lending startup that connects individual borrowers and individual lenders.” Ultimately, Moretti writes, “[w]hat really matters is that American workers produce goods or services that are innovative and unique and not easily reproduced.”

This does not mean that most American jobs will be, or should be, in innovation. On the contrary, Moretti estimates “about 10% of all jobs in the United States belong to the innovative sector.” This is because “the vast majority of jobs in a modern society are in local services,” such as “waiters, plumbers, nurses, teachers, real estate agents, hairdressers, and personal trainers.” As the new economic “engine,” innovation sector jobs create the need for those local services. They are at the core of growing ecosystems, but they are not “the largest sector.”

Local services, largely invulnerable to "national and international competition," belong to the "*non-traded sector*." (Moretti presents yoga as an example of a growing non-tradable industry). Traded sector jobs include innovation jobs as well as "traditional manufacturing, some services – parts of finance, advertising, publishing – and agricultural and extractive industries such as oil, gas, and timber […] [t]hey produce a good or service that is mostly sold outside the region and therefore needs to be competitive in the national and global marketplace." The implications of increased productivity are different for traded and non-traded sectors; the former must adapt quickly, while the latter sees fewer changes.

The other relationship between traded and non-traded sector jobs is that traded sector jobs create demand for non-traded local services. This is the aforementioned multiplier effect: "Every time a company generates jobs in the innovation sector, it also indirectly creates additional jobs in the non-traded sector in the same city." Moretti's research finds an impressive ratio: "for each new high-tech job in a metropolitan area, five additional local jobs are created outside of high tech in the long run." He looks at Silicon Valley, where "high-tech jobs are the *cause* of local prosperity, and the doctors, lawyers, roofers, and yoga teachers are the *effect*."

Moretti examines the reasons behind the high-tech multiplier effect, beginning with high-tech salaries (an average employee at Microsoft, he notes, makes $170,000). Another reason – one that drives much of Moretti's

vision for economic growth – is the proximity high-tech firms often share. "Bringing one high-tech company to a city eventually results in having more high-tech companies locate there, as dense high-tech clusters make high-tech firms more innovative and more successful […] The end result is the creation of more local service jobs and an even larger multiplier effect." Thus, small businesses rely on larger ones; the non-traded sector feeds off the income from traded sector jobs. "[T]he key lesson of the multiplier effect is that the economy is a tightly interconnected system, and what is good for one group typically tends to be good for another."

High-tech clusters see increased productivity, in part, because of knowledge spillovers. Moretti emphasizes the importance of "people and their ideas," noting that "[t]he main production input in scientific research is human capital." He tries to correct "[a] common fallacy" regarding innovative jobs: that "because they involve new technologies, they are 'new jobs.'" Not so, he says: "in many cases they are just replacing existing jobs."

A "new" aspect to the innovation sector is its approach to something that has always been there: human capital. "The rise of the innovation sector is associated with an increase in the value of talent, for a simple reason: economic value depends on talent as never before. In the twentieth century, competition was about accumulating physical capital. Today it is about attracting the best human capital." Turning to Facebook for an example, Moretti notes that founder Mark Zuckerberg acquired a startup in order to access the person who created it.

The investment was not in the startup itself; rather, it was in the person who generated new ideas.

There are two reasons for the increased value of ideas: globalization and technological progress. “Innovative industries are fundamentally different from all other industries in how they make their profits,” Moretti says. Software, for example, “can be reproduced millions of times at virtually no cost.” The expensive part, in this case, is the development stage. In the case of Microsoft Windows, “it costs Microsoft billions of dollars to make the first copy but only a few cents to make the second.” Research and development are “the main production costs” in the innovation sector. “Having access to global markets dramatically raises the returns on creating new ideas by increasing sales without increasing costs. It is therefore not surprising that the resources devoted to innovative activities have reached unprecedented levels.”

A new innovative product presents an opportunity to charge “*economic rent*,” in which “a price is significantly higher than production costs.” The ability to charge this “rent” comes from the innovator’s patent – another argument in favor of investing in research and development, which is ultimately an investment in talented human capital.

Chapter Three: The Great Divergence

Seattle, home to a cluster of high-tech firms, was once "heavily dependent on old-style manufacturing." The city "has completely transformed itself from a decaying old-economy provincial town into one of the world's preeminent innovation hubs." The pivotal change occurred in 1979, when Bill Gates and Paul Allen – co-founders of Microsoft – moved their headquarters from Albuquerque to their hometown. "This was not a business decision," Moretti writes; Seattle had "high unemployment and no clear prospects for future growth." The advent of Microsoft changed everything. Suddenly, Seattle was in a position to attract other high-tech firms. As Moretti notes, "[w]inners tend to become stronger and stronger, as innovative firms and innovative workers keep clustering there, while losers tend to lose further ground. Economists have a term for this: *multiple equilibria.*"

Microsoft's role in Seattle's economy is an example of the forces of agglomeration. Once Gates and Allen relocated, other high-tech companies followed. "Microsoft effectively serves as the anchor of the local high-tech sector and a magnet for other software companies." (For example, Amazon's founder left New York to start his business in Seattle fifteen years after Microsoft settled there). Human capital streamed towards this "magnet," including software engineers, programmers, and venture capitalists. In the high-tech world, "success generates more success." When innovators leave Microsoft to start their own firms, Seattle continues to benefit. "Microsoft alumni alone have started

four thousand new businesses, the majority of them in the Puget Sound area," Moretti writes. These high-tech magnets matter to residents *outside* the high-tech sector because of the multiplier effect. Demand for local services is a way to create jobs; in Microsoft's case, Moretti estimates a total of 200,000 new jobs.

He turns his attention from Seattle, seeking other hubs, suggesting that "to map innovation" one should "look for the inventors," which he does by studying patent statistics. California, New York, Texas, and Washington "generate the most patents," and California is well ahead of New York, which is second in line. ("Least innovative metropolitan areas," based on patent production, include New Orleans, Norfolk-Virginia Beach-Newport News, Miami, Las Vegas, and Nashville). Moretti points out that there is nothing inherently "smarter" about people born in Silicon Valley; rather, the Valley has the "unparalleled power to attract great ideas and great talent from elsewhere." These are the forces of agglomeration at work.

Other metropolitan areas of note include Austin, Texas (with Dell as a "key employer"), Raleigh-Durham, and Boston-Cambridge. The success of the latter two is connected to university presence: "local entrepreneurs […] turn the academic life sciences research done at [various universities] into commercial ventures." San Diego has reinvented itself, from "retirees and surfers to one of the world's most geographically concentrated biotech clusters, revolving around the Scripps Research Institute, the Salk Institute, and the University of California at San Diego." New Jersey's Middlesex-Somerset-Hunterdon area has a cluster

of pharmaceutical and medical companies. New York is “the undisputed world leader in financial innovation,” and shares with Los Angeles “a large number of digital entertainment jobs.” Washington D.C. draws life science companies, who want to be close to the National Institutes of Health. Dallas has a “major concentration of telecommunications jobs, a solid semiconductor presence anchored by Texas Instruments, and a growing data-processing cluster.” The commonality among all of these is their human capital: “[these cities] have a very skilled labor force and therefore a remarkably productive traded sector,” which means “more and better-paying jobs for everyone who lives there.”

A highly-educated labor force benefits the whole ecosystem, opening channels for “knowledge spillovers.” These spillovers – “sharing knowledge and skills through formal and informal interaction” – are considered “engine[s] of economic growth for cities and nations.” An influx of well-educated human capital can increase a city’s capacity for economic growth.

Moretti describes this benefit as a “*social return*,” suggesting that “well-educated individuals are not fully compensated for the social benefits that their education generates.” He adds, “[I]f the salary of college graduates reflected its full social value, more people would go to college. One way to correct for this market failure is to provide public subsidies for college education.”

Knowledge spillovers already take place in innovation clusters, but cities with less human capital have fewer opportunities to increase productivity through this type of communication. The presence of more high-skilled, well-educated

workers leads to the knowledge spillovers that can strengthen an ecosystem in both traded and non-traded sectors. Moretti observes that “college graduates are increasingly settling in cities where many other college graduates already reside, while high school graduates are increasingly settling in cities where many other high school graduates reside.” America, he contends, is “segregating educationally.” As “knowledge-intensive industries” drive the economy forward, cities with low access to human capital continue to suffer. (In a detailed look at poorer cities, Moretti highlights four examples in which geography – and, by extension, local economy – influence “private life”: life expectancy, divorce rates, political participation, and charitable giving).

Chapter Four: Forces of Attraction

Moretti studies several innovation hubs in order to see how they grew. As he notes, "[t]here are no obvious natural advantages to explain why innovative industries are located where they are." Why, he asks, do these firms cluster in expensive cities? Traditional manufacturing is inherently motivated to move to places with lower production costs. Innovative companies must invest in human capital – paying higher salaries and rent than they would pay elsewhere – in order to stay competitive. "[I]n the world of innovation," Moretti writes, "productivity and creativity can outweigh labor and real estate costs." He uses Walmart's Internet division as an example.

Walmart's headquarters are in Bentonville, Arkansas, where the company was founded. In Bentonville, "[o]ffice space […] is among the cheapest in the nation, and the cost of living and average wages are also low." Nonetheless, Walmart launched its Internet division near San Francisco, attracted by the forces of agglomeration. In San Francisco, Walmart had access to the region's human capital – to the "thick labor market" that draws so many innovative firms there.

Understanding the forces of agglomeration, Moretti says, is "the key to making struggling cities more economically successful." He cites examples of innovators that move from their original city to join an established cluster, including Zendesk, a high-tech firm that left Copenhagen for San Francisco. Both innovative firms and job-seekers are drawn to the same hubs – the former to find

the talent, the latter in search of work. “[In] most cities,” Moretti writes, “supply and demand for specific occupations are generally well balanced. If an overabundance of software jobs creates an excess demand for software engineers in a particular city at a particular time, engineers from all over the country will flock to that city and even out demand and supply.” A thick labor market – one of the forces of agglomeration – is a benefit to both sides.

Understandably, startups are drawn to established thick labor markets. Mark Zuckerberg moved Facebook from Cambridge – a city renowned as being one of the country’s “best-educated” – to Silicon Valley because he sought the “right talent.” In the Valley’s thick labor market, he knew he could find human capital with “precise skills.”

Moretti observes that “the thick-market effect is one of the main reasons for the concentration of the innovation sector in a small number of cities worldwide […] cities that do not already have an innovation cluster find it hard to create one.” In the same way that a skilled labor force increases local productivity, “firms and workers joining a cluster […] generate a benefit for all the other firms and workers in the cluster, which are made more productive by the new entrant.” Again, Moretti sees a market failure: “government intervention could improve efficiency by subsidizing workers and firms for the benefits they generate.”

Another thick-market effect is a more personal one. “The marriage market in the United States has become increasingly segregated along educational

lines," Moretti says. This trend has economic implications. In the past thirty years, couples in which each partner has a career has increased significantly. This means that thick labor markets are more attractive for "power couples" choosing a place to live. This also means that small cities "are losing competitiveness, especially in the eyes of professional couples with high levels of education."

Innovation hubs are attractive on an international level because of venture capital firms and a streamlined legal system. The same benefits that make Silicon Valley appeal to a U.S. citizen are appealing to entrepreneurs from Latin America: "an entire ecosystem […] of specialized services […] such as advertising, legal support, technical and management consulting, shipping and repair, and engineering support." Even within these ecosystems, geography plays a role. "From the point of view of the providers of these specialized services, geographical proximity to clients is crucial […] when a product is completely new." Thus, innovative ecosystems are self-sustaining: clients are there for access to their vendors, and vendors want to be close to their clients (and future clients).

Moretti takes another look at patents in his discussion of innovation hubs. In Chapter Three, he made note of which cities produce the most patents; here, he alludes to a study of patent citations, through which "an inventor is required to list all the previous inventions that her invention builds upon." The study showed that even in this case, geography plays a role: "inventors are significantly more likely to cite other inventors living nearby than inventors living farther away." This

"home bias" supports the idea that proximity matters. Moretti offers more examples of the importance of proximity, including Silicon Valley cricket games, which are also informal networking events, and the advent of "cowork" spaces. Cowork space brings "entrepreneurs, innovators, and artists" together to facilitate knowledge spillovers. "[T]he goal is 'radical collaboration.'"

One result of constant knowledge spillover is "*brain drain*," in which a company's "smartest employees […] start their own ventures." Typically, these new businesses complement their parent companies rather than competing with them. One high-tech firm can serve as an engine for economic growth – not only by creating demand for non-traded sector jobs, but also because it will likely "reproduce" through brain drain-founded startups. "[F]rom the perspective of local governments," Moretti writes, "attracting a high-tech job today will result in many more jobs in the future."

In combination, the three forces of agglomeration have created Seattles and Silicon Valleys, but they also increase the distances "between winners and losers." Strong cities grow stronger, while others are "trapped by their past," and "once a cluster is established, it is hard to move it. This is a case where the future of a city depends on its past," also known as "*path dependency.*" Moretti acknowledges that "regions without an innovation cluster will find it difficult to start one," though he adds that this is an advantage from a national point of view. "America's innovation sector is to some extent protected from foreign competition

[…] it is harder to delocalize innovative activity than to delocalize physical manufacturing."

Though he stresses the importance of high-tech clusters and innovative jobs, the importance of any given product is provisional. "A market economy is never static," Moretti writes. "Industries that are on the technological frontier will become mainstream and, later, relics of the past." (Indeed, he describes Detroit as "the Silicon Valley of its time"). The key to survival – and growth – is adaptability (as illustrated by Pixar in Chapter Two). "Clusters […] need to leverage their unique strengths to reinvent themselves *before* the tipping point is reached and the local ecosystem enters a downward spiral." The Bay Area "reshapes itself every year," avoiding stagnation and staying adaptable. Local ecosystems are strongest when they focus on their particular skills: "Different communities differ in their values and expertise, and this inevitably shapes the new ideas they generate, ultimately resulting in something unique and hard to reproduce elsewhere. The innovative process is largely about the unexpected cross-fertilization that results when different parts of a community connect."

As he encourages adaptability, Moretti looks at examples of cities that "have failed to reinvent themselves." One example is Rochester, New York, an innovation cluster (including Xerox and Kodak) in the 1980s. Digital photography changed the imaging industry, and Rochester "was not able to move to something new." The key, Moretti suggests, is to always anticipate change.

He closes Chapter Four with “two key questions” about the forces of attraction and the American economy. “How can we, as a nation, maximize the chances that our innovation hubs follow the path of the San Francisco-Silicon Valley cluster and not that of Detroit and Rochester? The second question is how to help the many remaining cities that do not have a concentration of good jobs and skilled workers and are lagging behind.”

Chapter Five: The Inequality of Mobility and Cost of Living

Having identified which cities are the strongest innovation hubs, Moretti turns to the question of *who* can live there and *how*. “Willingness to relocate is a large factor in the country’s prosperity, and it always has been,” he writes. “More than that of any other developed country, America’s population has always been on the move, chasing the next opportunity.”

As Moretti shows in the preceding chapters, a person’s education is a determining factor in where they will live and work. “[T]he more education a person has, the more mobile she is. College graduates have the highest mobility, workers with a community college education are less mobile, high school graduates are even less, and high school dropouts come at the bottom of the list.”

The difficulty endemic to “chasing opportunities” is the expense. Furthermore, not all job markets are the same: “[T]he job market for professional positions is a national one, while the job market for manual or unskilled positions tends to be more localized, so that people ignore good job opportunities in other cities.”

Exploring the relationship between education and mobility, Moretti suggests that “a lack of education” is a multifaceted challenge. He names “a dearth of information about opportunities elsewhere, a shortage of the kinds of skills necessary to make a big life change, and especially a lack of cash” as

obstacles. “Relocating is like an investment: you spend money up front, to cover the direct costs of the move and your living expenses until a job becomes available, in exchange for a better job later.” With limited credit or savings, such a move is impossible. The other possibility is cultural reluctance to move – prioritizing local community over job prospects.

Moretti critiques the government’s unemployment insurance system, suggesting options for policy reform. “What is striking about the system is that it does not provide any incentive for unemployed workers to look for jobs in places with better labor markets,” he writes. “If anything, it discourages mobility from high-unemployment areas to low-unemployment ones, because it does not compensate for the difference in the cost of living.” He calls for “adjust[ment] to reflect the vast and growing differences in economic fortunes among American cities” by introducing a “mobility voucher that would cover some of the costs of moving to a different area.” This policy, he argues, would also help those who refuse to move, because competition for local jobs will decrease.

As for college graduates, their mobility is a benefit for the cities in which they want to live. Not surprisingly, college graduates flock to innovation hubs, regardless of the state in which they went to school. “States like Michigan and Ohio, with world-class systems of public higher education, struggle to retain many of their college graduates, who are more drawn to opportunities in California and New York.” This is a win for innovation hubs, but not for other states: “[I]t significantly limits the ability of struggling states to build a sustainable

base by investing in higher education." Since the social benefit of these universities is national, Moretti wonders if federal investment in universities is appropriate.

Much of mobility has to do with cost of living – one must be able to afford life in his new city – and Moretti highlights another way that innovation hubs influence their local economies: the housing market. "[A]reas with the most affordable cost of living tend to have the weakest labor markets," he writes. On the other hand, "When the labor market in a city strengthens, both workers' earnings and the cost of housing tend to increase." For homeowners in innovation hubs, home equity is another benefit of proximity to the hub.

Another result of a stronger labor market is gentrification – a contentious subject, but one that Moretti sees clearly. "Original homeowners benefit from gentrification," he writes. There are "social costs" – namely, cultural changes – but, in San Francisco's case, "the people who are benefitting most from this influx of high-tech workers are the largely Latino homeowners who have been selling their property to the newcomers." Of course, not all "original" residents own homes, and those who cannot afford the new cost of living are "displaced."

Efforts to stop this displacement, Moretti argues, are short-sighted. He uses the city of Berkeley as an example: "Berkeley, […] in an effort to protect 'good blue-collar jobs' has effectively stunted high-tech growth in the entire west side of the city." He adds, "Constraining new high-tech office buildings amounts to reducing the number of jobs that a city can create […] Because of the

multiplier and spillover effects, this policy ends up hurting the very people it is intended to help […] unskilled workers in a city have much to gain from the fortunes of the more skilled workers who live next door, as their very livelihoods often depend on sustained growth in the innovation sector." Similarly, "[c]urtailing new residential developments also makes little sense […] if there is high demand for housing in a city, reducing supply can only raise the price." Gentrification, he concludes, "is a good problem to have."

Chapter Six: Poverty Traps and Sexy Cities

Moretti aims to answer a vital question in his sixth chapter: “Can we help [struggling cities] create a self-sustaining local ecosystem that creates good jobs in the community?” To find the answer, “one way is to look at how existing innovation clusters were created and see whether that process can be reproduced elsewhere.”

His first example is the biotech industry, which grew rapidly in 1973. Thirty years later, there are three major biotech clusters: Boston-Cambridge, San Francisco, and San Diego. “There was nothing to suggest that the cities now at the top of the chart were necessarily going to be the winners,” Moretti says, though “[t]he conventional wisdom is that all three had premier universities.”

He suggest that we “look a little deeper” to see why these clusters flourished. “The average metropolitan area has five colleges and two universities,” he writes. “It would be difficult for a biotech cluster to sprout without being physically close to a university.” Nor, he says, “is it a question of being close to a *top* university,” as there are numerous top universities without biotech clusters nearby. His findings correlate with the forces of agglomeration: an academic “superstar,” renowned for his or her research, has incredible magnetic power.

“There are two reasons for the power of stars. First, scientists and researchers in private-sector startups need to be physically close to frontier

academic research in order to remain on the cutting edge […] Employees of private-sector research firms can reap the benefits of these knowledge spillovers only when their labs are physically close to those of top academic researchers. A second reason is that stars are often personally involved in the creation of leading private-sector startups." Ultimately, Moretti claims that even though "luck" played a role in where the "stars" happened to live, "what happened later was not random: the self-reinforcing nature of clusters means that once a cluster has started, it keeps attracting companies and workers."

Moretti notes that many "hubs of innovative activity have agglomerated in unlikely places," including Hollywood's film industry. In 1913, New York had the majority of studios; six years later, studios were concentrated in California. This was largely the result of a wave of human capital, as "talented immigrants" amassed in Hollywood (Moretti compares this to the Chinese and Indian engineers who are drawn to Seattle and Silicon Valley today). The other reason Hollywood became the top site for filmmaking was a star director, D.W. Griffith, who shot "the first big-budget blockbuster in history." The origins of innovative hubs can often be traced to stars, both in Hollywood and in academia, but the cities themselves rarely stand out as obvious choices. ("Manufacturing clusters," on the other hand, can trace their history to "cheap transportation of heavy materials over waterways").

High-tech clusters are hard to predict and hard to create, Moretti says. "Struggling communities all across America are now trying to reinvent

themselves." One tool used in this effort is public policy. "*Place-based policies*" are "a form of welfare, but they target cities, not individuals." To assess the utility of place-based policies, Moretti looks at several examples.

First, he describes "the economy of a struggling city […] Even if real estate is dirt cheap, skilled workers do not want to be there, because they know there are no jobs; innovative companies do not want to be there either, because they know there are no skilled workers." Moretti describes two urban revitalization strategies. "One – I will call it the *demand side approach* – tries to attract employers with the hope that workers will follow. This often involves providing incentives and tax breaks to make a place attractive to companies. The other, which I will call the *supply side approach*, tries to attract workers with the hope that employers will follow."

Moretti looks at Berlin, "one of the world's coolest cities." Despite its amenities – "one of Europe's most affordable housing markets; government-subsidized, high-quality child care; good schools; and outstanding public infrastructure," the city has "failed to attract a solid economic base." The city itself is attractive – "tourism is one of the main source of jobs" – but it hasn't become an innovation hub. "Glamour is not enough to support a local economy," he concludes.

Next, he addresses the role of universities. "The presence of a college or university in a city increases both the supply of college graduates, by educating some and attracting others from outside, and the demand for college graduates,

by making them more productive." The demand arrives by way of three channels: "First, some businesses are created directly as a result of academic research." Second, research creates opportunities for knowledge spillovers; these spillovers can generate innovative businesses. "A third channel is through a university's medical school and its associated hospital." While a university *is* a source of local jobs, Moretti cautions against overemphasizing its importance. "[Mayors] and local policymakers should realize that a university – even a good one – is no guarantee of economic success." Furthermore, "proximity to a research university is important, but it is not enough on its own to form a sustainable cluster of innovative companies." Rather than serving as an anchor, "[u]niversities are most effective at shaping a local economy when they are part of a larger ecosystem of innovative activity."

Moretti turns his focus to the second revitalization strategy: "to increase the demand for labor by attracting employers." Options include "offering targeted incentives to innovative companies to locate in a struggling community, in the hope of forming a cluster that in the long run becomes self-sustaining […] The difficult part, of course, is jump-starting the cluster."

He reviews several "jump-starts" by looking at "big push" strategies and their outcomes, starting with Washington University in St. Louis. The economics chairman wanted his department to rise in the rankings; to do so, he needed to get beyond the department's "*poverty trap*," in which weak ecosystems get weaker because it is hard to attract new talent. His "big push strategy" was to

acquire academic stars. He was able to bring them to Wash U. by offering a high salary – $600,000 – and the presence of stars drew other talent to the department. The 2008 financial crisis damaged this progress because of its effect on the school's endowment, but the choice to hire stars effectively "broke" the poverty trap.

For cities, Moretti defines a "big push" as "a coordinated policy that breaks the impasse and simultaneously brings skilled workers, employers, and specialized business services to a new location. Only the government can initiate these big-push policies, because only the government has the ability to coordinate the individual actors – the workers and employers – to get the agglomeration process going." Moretti suggests initial public subsidy with the goal of creating self-sustaining clusters. He offers a history of big push strategies, including the Tennessee Valley Authority (TVA). The TVA, created during the Great Depression, successfully became "a largely self-sustaining entity." Even so, it had its drawbacks. "While the program was successful in moving the region from a low-productivity sector (agriculture) to a high-productivity sector (manufacturing), it did not succeed in raising local wages […] more and more workers moved there […] This increase in the supply of labor effectively offset the increase in demand." The challenge, Moretti says, is that "local policymakers must be able to pick promising companies to invest in. They need to be a little like venture capitalists."

He next turns to Taiwan, “the clearest example of big-push success.” Taiwan “transformed its rural economy into an advanced one with a dynamic innovation sector through a large-scale policy of government-sponsored research in the 1960s and 1970s. The program succeeded in bringing top Chinese scientists back from the United States and establishing a cluster of publicly supported R&D that eventually became thick enough to sustain private companies.” In this case, “policymakers turned out to be good venture capitalists.”

Fremont, California was a far less-successful venture capitalist. Historically a center for car manufacturing, the city was “trying to reinvent itself as a center for green R&D.” Tesla Motors, an electric car company, took over an old factory, and solar companies began to form a cluster. Solyndra, a solar panel company, seemed like an especially promising venture, but its “business model was based on a seriously flawed premise. It depended entirely on the competitiveness of a new type of solar array, which was supposed to generate power more cheaply than silicon-based solar cells.” The price of silicon fell over time, and eventually Solyndra filed for bankruptcy. Moretti recommends that government involvement should primarily address market failures. “In the case of green tech, this means externalities associated with the innovation phase, not the production phase,” he writes.

He nods to the federal Empowerment Zone Program as a strong model of place-based policy. The Empowerment Zone Program “provided a package of

employment tax subsidies and redevelopment funds to 'distressed' urban areas […] subsidies were designed to encourage economic and social investment." Moretti opines that the reason this program succeeds is that "neighborhood revitalization […] generates many externalities." He takes note of three ways the program worked: first, it incentivized "collective action." Second, "policymakers did not act as venture capitalists: public funds were directed toward any form of investment that might benefit the community. Third, and crucially, public subsidies were not just a giveaway but were the catalysts for significant *private* investment." Government intervention is most effective, Moretti contends, when it "leverag[es] local strengths and expertise." The goal is never to create an ecosystem reliant on public funds; rather, the goal is to lift communities out of the poverty trap and to guide them towards self-sustainability.

Chapter Seven: The New Human Capital Century

In his final chapter, Moretti reiterates the importance of innovation and relegates manufacturing to the past. “Factories were the places where economic value was created. But today little value remains in the production of goods that anybody can make,” he writes. “Good jobs and salaries increasingly come from the production of new ideas, new knowledge, and new technologies.” Cities, enriched by human capital, are the “new factories.”

He praises the strengths of the American economy: “It rewards personal effort and risk-taking more effectively than most other countries. This is a crucial advantage in attracting top talent.” He adds that “America’s capital markets and venture capital system remain among the most efficient anywhere […] Most important, because of its dynamic brain hubs, the United States is well positioned to continue to generate innovative activity.”

Having recognized the strengths, he turns to the flaws. “Most of the energy and attention in our policymaking is concerned with short-run issues […] their importance pales relative to that of long-term ones, because the latter are the ones that really affect our standard of living in profound and permanent ways.” Moretti goes on to highlight two “structural weaknesses,” both of which can be improved with more attention to (and investment in) human capital. “Human capital and research are the engines that sustain the American economy and its workforce. As we have seen, some American cities are lacking in both.

But the problem is bigger than that. The United States as a whole is not investing enough in human capital and research. As a consequence, our salaries are not growing at the rate they used to, and inequality is increasing." How, he wonders, can the country "regain the strength that made it the dominant economic player of the twentieth century"?

Part of the answer is investment. "[P]ublic and private investments in research are insufficient," he writes. "American universities and companies […] invest too little compared to what would be socially optimal. This is caused by a serious failure in the market for knowledge." The private sector already commercializes new findings from university research, but not sufficiently. "Globalization and technological change have resulted in increased returns on the creation of new commercial knowledge, as we have seen. This means that the potential economic value of new discoveries in basic science has also increased."

As discussed in earlier chapters, knowledge spillovers are a valuable outcome of investment in innovation. "In essence, private investment in innovation has a private return for the firm that makes that investment, but it also supplies a social return that benefits other firms." There is insufficient investment because the (social) return "cannot be fully captured" – a market failure the government can correct. Moretti proposes that the government "step in and compensate those who invest in R&D for the external benefits that they generate […] the current U.S. tax credit for corporate spending on R&D is far smaller than

it should be. We need to increase federal support for academic research in science and engineering and especially for private R&D."

Investment in research is one of the ways to strengthen the economy; a second way is to create more human capital. Moretti asserts that the best way to increase human capital is to increase access to education. As the country transitions from manufacturing to innovation, the demand for college-educated workers continues to grow. The demand is growing, but there is a "slowdown in the supply." The government may not be able to create innovation hubs at will, but it *can* create more college-educated human capital – an essential ingredient for innovation ecosystems. Moretti views a college degree as an investment with a multitude of returns. "[I]nvestment in human capital differs from other kinds of investment" because it is "completely immaterial. This explains why the private sector isn't jumping in to help people go to college."

As important as college is, Moretti says, early education is "the most important factor." He writes, "Children who grow up with friends who have no interest in college are less likely to go than children with college-bound peers." Troubled by the country's high school dropout rate, he points again to the demand for educated human capital. "It is more and more challenging for innovative companies to find workers with the right skill set." There are two ways to address the problem: "to improve the quality of education – particularly high school math and science – in order to increase the number of Americans with college degrees. The other is to import human capital from abroad by allowing

skilled immigrants to move here."

Moretti continues, "It is in America's self-interest to radically reform its immigration policy to favor immigrants with college degrees, master's degrees, and PhDs." The effect of "highly skilled immigrants is apt to be positive, especially for low-skilled Americans." He offers three reasons: "[H]igh-skilled immigrants do not compete directly with low-skilled Americans. In fact, the two complement each other, which means that an increase in the former group is likely to raise the productivity of the latter group. Second, firms are apt to respond to an inflow of highly skilled immigrants by investing more […] Third, skilled immigrants generate important spillovers at the local level, since an increase in the number of highly educated individuals in a city tends to strengthen the local economy, thus generating local jobs and raising natives' wages."

Moretti closes by emphasizing the need for more human capital, whether through immigration reform or investment in education. The ultimate goal is to have more minds at work. If cities are the new factories, the new hallmark American products are ideas.