

Management

Enrico Moretti: The Geography of Jobs

Why are some places more prosperous than others? A scholar explores the “brain hubs” phenomenon.

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Americans frequently debate why wages are growing for the college-educated but declining for those with less education. What is less well-known is that communities and local labor markets are also diverging economically at an accelerating rate.



Silicon Valley has kept reinventing itself in ways that are remarkable. (Flickr)

A closer look at the 300-plus metropolitan areas of the United States shows that Americans with high school degrees who work in communities dominated by innovative industries actually make more, on average, than the college graduates working in communities dominated by manufacturing industries, according to research by University of California, Berkeley economist [Enrico Moretti](#), the author of *The New Geography of Jobs*, a book that *Forbes* magazine called "easily the most important read of 2012." In the San Jose metropolitan area, for example, a high school graduate averages \$68,009, compared with the \$65,411 that is average for a college graduate in Bakersfield, Calif.

Some places have always been more prosperous than others, but these differences have increased more rapidly over the last 30 years as the gross domestic product and patents for new technologies have concentrated in two to three dozen communities that Moretti identifies as "brain hubs" or "innovation clusters."

In these clusters, highly specialized innovation workers, such as engineers and designers, generate about three times as many local jobs for service workers — such as doctors, carpenters, and waitresses — as do manufacturing workers, Moretti said recently when speaking at Stanford Graduate School of Business. Here are edited excerpts from Moretti's answers to questions from the Stanford audience.

What causes clusters to emerge?

This is a very active area of research, but I think fundamentally, there are three major reasons why clustering takes place. One is the thick labor market effect. If you are in a very highly specialized position, you want to be in a labor market where there are a lot of employers looking for workers, and a lot of workers looking for employers. The match between employer and employee tends to be more productive, more creative and innovative in thicker labor markets.

It is the same thing for the vendors, the providers of intermediate services. Companies in the Silicon Valley will find very specialized IP lawyers, lab services, and shipping services that focus on that niche of the industry. And because they are so specialized, they're particularly good at what they're doing.

The third factor is what economists call human capital spillovers — the fact that people learn from their colleagues, random encounters in a coffee shop, at a party, from their children, and so on. There's a lot of sociological evidence that this is one of the attractions of Silicon Valley. You're always near other people who are at the frontier, so you tend to exchange information. Sometimes it's information about job openings. Sometimes it's information about what you're doing, what type of technology you're adopting, what type of research you are doing. And this, as you can imagine, is important for R&D, for innovation.

So these three forces are crucial, and that means that localities that already have a lot of innovation tend to attract even more workers and even more employers. That further strengthens their virtuous circle.

Are these clusters sustainable forever?

Probably not. Previous clusters have collapsed in spectacular ways. The Silicon Valley of the 1950s was Detroit. People have researched the rise of Detroit, and it mimics very well the rise of Silicon Valley in terms of the amount of innovation, the type of engineering, the type of salaries they were paying. In the 1950s, if you were a car engineer, there wasn't any better place in the world to be, and if you were a car company, you had to be there. But then, of course, it collapsed.

Some types of clusters don't survive big negative shocks, and others are able to leverage themselves into the next thing.

In my book, I have a chapter on the difference between Detroit and Silicon Valley. This region has kept reinventing itself in ways that are remarkable. It was all orchards, and then it became all hardware, and then it became all software. And now it's becoming something else: social

media and biotech and clean tech. Some types of clusters don't survive big negative shocks, and other clusters are able to leverage themselves into the next thing.

Is there a clean energy cluster that is structurally different from an internet or an IT or a biotech cluster? Or are they all intermingled?

Typically, clusters are very specialized. Silicon Valley is the exception in the sense that there are so many different technologies. More typical examples are Boise, Idaho, for radio technology or Portland, Oregon, for semiconductors. Seattle has a combination of software and now a growing body of life sciences. Boston is mostly life science. D.C. is a remarkable story. It's very diversified now in terms of private-sector innovation, but most clusters are going to be small pockets of one industry.

Does your argument hold for high-paid but non-high-tech sectors? I was thinking of New York being a financial sector or L.A. being entertainment, and Houston being oil and gas. Then you mentioned Washington, D.C. That's government.

I would argue that three you mentioned would belong to what I define as innovation sectors in the following sense: Finance in New York is not bank tellers; it's people who invent new products, new technology, and new ways of making things. They are unique, and you can't easily reproduce the cluster somewhere else. That certainly applies to entertainment, especially the digital part of entertainment that is the fastest-growing part of entertainment jobs.

It also applies to the D.C. cluster. The growth of D.C. over the last 20 years is mostly driven by private-sector headquarters moving there, and an educated labor force. Some of the companies are military contractors. Some companies are life science. They're anchored by the National Institutes of Health being there, and other government agencies. But most of the growth actually comes from the private sector.

Now oil, Houston, I'm not sure. I don't know how strong these clustering forces are for these type of jobs. I would imagine — and we're not talking about the guy who drills, but it's more like the guy who plans where to drill — to the extent that there is a high component of innovation that makes something that is unique, I would say it applies.

If I'm a high-tech worker, how am I responsible for creating five other jobs? It's hard for me to accept there are five.

The way to interpret the multiplier is to imagine dropping 1,000 innovation jobs in one city but not in another, and then going back 10 years later to measure how many additional local service jobs there are in the city that experienced that innovation-sector drop of jobs. So it's a long-run effect, but it's not impossible for three reasons.

One is that the average high-tech worker tends to do very, very well, and people who are wealthy tend to spend a large fraction of their salary on personal and local services. They tend to go to restaurants and movies, and to use taxis and therapists and doctors on average more than people who are paid less.

The second reason is high-tech companies themselves employ a lot of local services; everything from security guards to IP lawyers, from the janitor to the very specialized consultant. High-tech companies tend to use more services than manufacturing companies.

The third reason is the clustering effect. Once you attract one of those high-tech workers, then in the medium to long run, you're going to be attracting even more of those high-tech workers and companies, which will further increase your multiplier. So it's a long-run number, measured over a 10-year period.

You pointed out that the salaries of the less-educated part of the local population are higher in those places that do have a lot of the innovation. How is that reconciled with the drastic drop over 30 years in their national average compensation?

We don't have enough brain hubs where innovation is concentrated. We have 320 metro areas in the U.S., and probably, by my definition, we have 15 to 20 brain hubs. In those places, you have brisk job creation outside the innovation sector, and you have decent wages for people outside. But we also have a big chunk of the country producing not very much, in part because manufacturing jobs have been shrinking, and innovation hasn't really taken place.

So what hope is there for these areas?

That's a million-dollar question. It's tough because, in some sense, if this clustering effect is particularly strong, it's good news for places like here, but it's terrible news for places like Flint or Detroit. A successful local labor market has a very nice equilibrium, where you have a lot of skilled workers who want to go there and a lot of innovative employers who want to go there. It's really hard to re-create somewhere else.

And it's not like we're not trying. We're spending \$15 to \$18 billion annually in what economists call place-based policies, which are essentially subsidies to try to attract employers to these areas. The idea being: "They're not coming, so if we just break this vicious circle, if we just bring some, then the clustering effect starts taking off. We can effectively create innovation hubs where they don't exist."

I haven't found one example of an innovation hub in the U.S. that has been created by deliberate policy that says, "We're going to create an innovation hub here." Taiwan might be a good success story. It's hard to get data, but Taiwan was an agricultural economy in the 1960s that had very little innovation. Then in the 1970s, it created enormous government subsidies for semiconductors and a lot of other technologies. All the others didn't pan out, but semiconductors worked. Taiwan is still putting money in, so it's not exactly clear whether it's a perfect example. Picking the next big thing is very hard for the venture capitalist. It's virtually impossible for the government worker.

What's the situation in other regions around the world?

Obviously, India and China are major success stories, but that doesn't mean that this clustering effect is not at play within those countries. A different example is Italy, where I am from. Italy has been the Detroit in this story. It had a very strong pharmaceutical sector in the 1980s, and a smaller computer cluster. Once the pharmaceutical industry started becoming global, you saw mergers and a concentration of the industry's R&D in a few places. I know because my dad was employed there, and his lab was first moved to Sweden and then to New Jersey.

I think the same is happening throughout many countries in continental Europe, and even in places like China and India, which have success stories but enormous regional differences. The innovative part of the Chinese economy is concentrated in a handful of megalopolises.

This is an interesting paradox of the current economy. Probably the best news of the last 20 years globally is the vast increase in the standard of living in places like China and India and Brazil, so there's certainly been a convergence in the standard of living when you compare nations. But when you look within those developing nations, you see the same great divergence that you see here.

Enrico Moretti is professor of economics at the University of California, Berkeley. His talk at Stanford was hosted by the Stanford Program on Regions of Innovation and Entrepreneurship, located in Stanford GSB.

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